SONY

DIGITAL HD VIDEOCASSETTE RECORDER

HVR-1500

ANALOG INPUT BOARD

HVBK-1505

HDV 1080i DVCAM Digital Video Cassette Mini Digital Video Cassette

SERVICE MANUAL

Volume 1 1st Edition

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠ WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠ WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠ AVERTISSEMENT

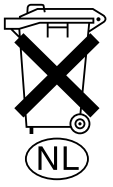
Ce manual est destiné uniquement aux personnes compétentes en charge de l’entretien. Afin de réduire les risques de décharge électrique, d’incendie ou de blessure n’effectuer que les réparations indiquées dans le mode d’emploi à moins d’être qualifié pour en effectuer d’autres. Pour toute réparation faire appel à une personne compétente uniquement.

Für Kunden in Deutschland

Entsorgungshinweis: Bitte werfen Sie nur entladene Batterien in die Sammelboxen beim Handel oder den Kommunen. Entladen sind Batterien in der Regel dann, wenn das Gerät abschaltet und signalisiert “Batterie leer” oder nach längerer Gebrauchsdauer der Batterien “nicht mehr einwandfrei funktioniert”. Um sicherzugehen, kleben Sie die Batteriepole z.B. mit einem Klebestreifen ab oder geben Sie die Batterien einzeln in einen Plastikbeutel.

Voor de klanten in Nederland

Gooi de batterij niet weg maar lever deze in als klein chemisch afval (KCA).



For the customers in Taiwan only

廢電池請回收

注意

指定以外の電池に交換すると，破裂する危険があります。
使用済の電池は，説明書に従って処理してください。

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

Vorsicht!

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Ersatz nur durch denselben oder einen vom Hersteller empfohlenen ähnlichen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

ADVARSEL!

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

ADVARSEL

Lithiumbatteri - Eksplosjonsfare.
Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandøren.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en likvärdig typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt gällande föreskrifter.

VAROITUS

Paristo voi räjähtää jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

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Manual Structure

Purpose of this manual

This manual is the Service Manual Volume 1 for the digital HD videocassette recorder HVR-1500, the option board Analog Input Board HVBK-1505.
This manual contains the maintenance information of this equipment, and servicing information necessary for parts replacement and adjustments.

Related manuals

In addition to this Service Manual Volume 1, the following manuals are provided.

- **Operation Instructions**
  HVR-1500 (Supplied with HVR-1500)
  Part number : 3-993-538-1X
  HVBK-1505 (Supplied with HVBK-1505)
  Part number : 3-993-605-0X

- **CD-ROM Manual (Supplied with SY model)**
  This manual contains the Japanese, English, French, German, Italian, and Spanish operating instructions (PDF).
  Part number : 3-993-560-0X

- **Service Manual Volume 2 (Not Supplied with equipment)**
  Contains the semiconductor pin assignments, parts lists, block diagrams, board layouts and schematic diagrams.
  Part number : 9-968-317-0X

- **“Semiconductor Pin Assignments” CD-ROM (Available on request)**
  This “Semiconductor Pin Assignments” CD-ROM allows you to search for semiconductors used in Broadcast and Professional equipment.
  The service manual volume 2 contains a complete list of semiconductors and their ID Nos., and thus should be used together with the CD-ROM.
  Part number: 9-968-546-06

Trademark

Trademark or registered trademark used in this manual is follows.

• Windows is a registered trademark of Microsoft Corporation.

Section 1
Installation

Be sure to install the HVR-1500 in location satisfying the required operational environment described below to assure the HVR-1500 superior performance and to maintain the excellent serviceability and accessibility.

1-1. Operating Conditions

CAUTION

Good air circulation is essential to prevent internal heat build-up. Place the unit in location with sufficient air circulation.
Do not block the ventilation holes of the cabinet and the front and rear panels.

Operating temperature: 5 °C to 40 °C
Operating humidity: Less than 80 %
Storage temperature: −20 °C to 60 °C
Locations to avoid:

- Areas where the unit will be exposed to direct sunlight of any other strong lights.
- Areas near heat sources.
- Dusty areas or areas subject to vibration.
- Areas with strong magnetic field.
- Areas with much electrical noise.
- Areas with much static electricity.
- Areas windtight.

Tilt allowance: Within 30° (Do not slant the front and rear of the unit more than 30°.)

CAUTION

Fix the unit securely to avoid drop when the unit is operated at not-horizontal place.

1-2. Power Supply

1-2-1. Voltage and Power Requirements

This unit's power line has a switching regulator.

CAUTION

Be sure to operate the unit within the range of following power voltage.

Power voltage:	AC 100 to 240 V ±10 %
Power frequency:	50 Hz or 60 Hz
Power consumption:	60 W
Rush current:	Power voltage 100 V IN: 12 A
	Power voltage 240 V IN: 34 A

Note

AC power supply is required a capacity which is commensurate with rush current.
If the capacity of the AC power supply is not enough, the breaker of AC power of a supply side may operate or this unit may not operate normally.

1-2-2. Recommeded Power Cord

This unit does not come with a power cord.
To get a power cord, please contact your local Sony Sales Office/Service Center.

WARNING

- Use the approved Power Cord (3-core mains lead)/ Appliance Connector/Plug with earthing-contacts that conforms to the safety regulations of each country if applicable.
- Use the Power Cord (3-core mains lead)/Appliance Connector/Plug conforming to the proper ratings (Voltage, Ampere).

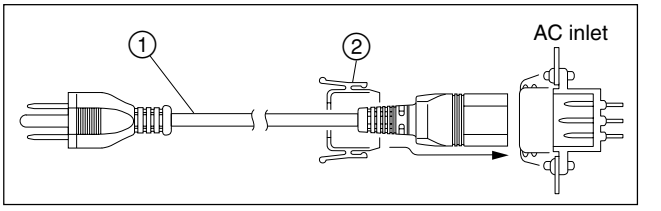
If you have questions on the use of the above Power Cord/ Appliance Connector/Plug, please contact your local Sony Sales Office/Service Center.

WARNING

- Never use an injured power cord.

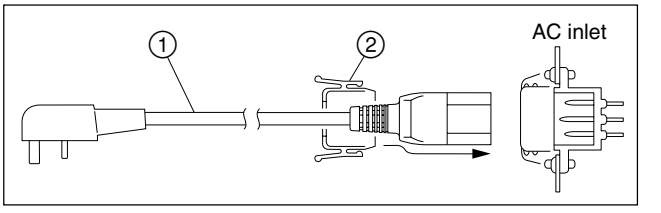
For customers in the U.S.A. and Canada:

① Power cord 125 V 10 A (2.4 m): ⚠1-551-812-11
② Plug holder (Brown): 3-613-640-01



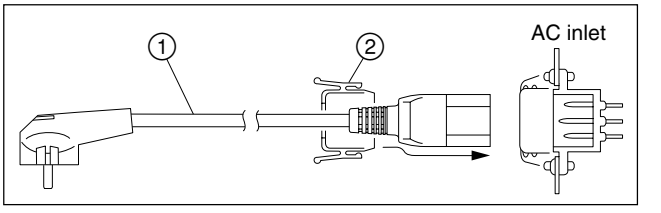
For customers in the United Kingdom:

① Power cord 250 V 10 A (2.4 m): ⚠1-782-165-11
② Plug holder (Brown): 3-613-640-01



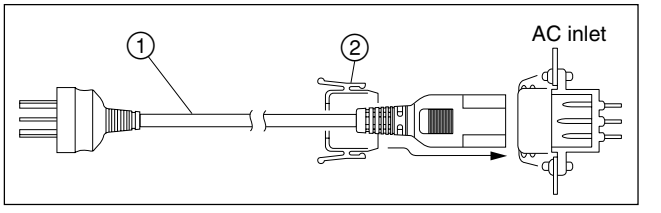
For customers in European countries except the United Kingdom:

① Power cord 250 V 10 A (2.0 m): ⚠1-551-631-15
② Plug holder (Brown): 3-613-640-01



For customers in the China:

① Power cord 250 V 10 A (1.8 m): ⚠1-783-481-41
② Plug holder (Brown): 3-613-640-01



If the unit is used in the area except above, please contact your local Sony Sales Office/Service Center.

1-3. Supplied Accessories

- Operating instructions : 1
- Operating instructions (CD-ROM) : 1

1-4. Optional Accessories

- AC power cord
- Analog input board : HVBK-1505
- 9-pin remote conrtrol cable : RCC-5G (Length : 5 m (16 ft))
- Remote control unit : DSRM-10
- Digital video cassette : PDV-184∗/124∗/94∗/64∗ (Standard-size (L))
  PDVM-40∗/32∗/22*/12∗ (Mini-size (S))
  PHDV-276DM∗/186DM∗/124DM∗/64DM∗ (Standard-size (L))
  PHDVM-63DM∗ (Mini-size (S))

  Note

  The ∗ in each model name is actually “ME” (indicating that a cassette memory is contained), “N” (indicating that no cassette memory is contained) or “MEM” (indicating a master tape).

- Cleaning cassette tape : PDV12CL (Standard size), PDVM12CL (Mini size)

1-5. Matching Connectors/Cables

When external cables are connected to the connector on a connector panel during maintenance, the following connectors, cables (or their equivalents) must be used.

Connectors on HVR-1500 Side	**Matching connector/cable**		
Panel indication	**Designation**	**Sony Part No.**	**Remark**
ANALOG IN REF. VIDEO IN (SD/HD) TC IN VIDEO IN	BNC, MALE	1-560-069-11	 When HVBK-1505 is attached
AUDIO IN CH-1/3, 2/4	XLR 3P, MALE	1-508-083-11	When HVBK-1505 is attached
ANALOG OUT TC OUT VIDEO OUT	BNC, MALE	1-560-069-11	
MONITOR AUDIO	PIN PLUG	Standard Product	
AUDIO OUT CH-1/3, 2/4	XLR 3P, FEMALE	1-508-084-11	
HDV/DV	IEEE1394 6P (1 m) IEEE1394 6P (3.5 m)	1-782-408-21 1-791-184-11	
SDI IN	BNC, MALE	1-560-069-11	
SDI OUT1, 2	BNC, MALE	1-560-069-11	
HD-SDI OUT 1, 2	BNC, MALE	1-560-069-11	
AUDIO I/O (AES/EBU) IN CH-1/2, 3/4	BNC, MALE	1-560-069-11	
OUT CH-1/2, 3/4	BNC, MALE	1-560-069-11	
REMOTE	D-SUB 9P, MALE	1-560-651-11	

1-6. Input/Output Signals of the Connectors

INPUT

REF. VIDEO IN (SD/HD) :
BNC × 2 (loop-through with 75 Ω automatic terminator)
SD composite sync, black burst: 0.286 V p-p (525/60) or 0.3 V p-p (625/50), 75 Ω, negative sync
HD tri-level sync: 0.3 V, 75 Ω, negative sync

VIDEO IN:
BNC × 4 (When HVBK-1505 is attached)
Composite
Y/S-Y/CPST and 1 loop-through connector with 75 Ω automatic terminator: 1.0 V p-p, 75 Ω, negative sync
Component
Y/S-Y/CPST: 1.0 V p-p, 75 Ω, negative sync
R-Y/S-C and B-Y: 0.7 V p-p (75 % color bars for 525/59.94 or 100% color bars for 625/50) , 75 Ω
S-video
Y/S-Y/CPST: 1.0 V p-p, 75 Ω, negative sync
R-Y/S-C: 0.286 V p-p (525/59.94) or 0.3 V p-p (625/50), 75 Ω (burst level)

SDI IN:
BNC × 1
Serial digital interface format (270 Mbps), SMPTE 259M/ITU-R BT.656

AUDIO IN:
XLR 3-pin × 2, FEMALE (When HVBK-1505 is attached)
+4/0/−3*/−6 dBm , high impedance, balanced
*: For 625/50 only

AUDIO I/O (AES/EBU) :
BNC × 2
Complying with AES-3id-1995

TC IN:
BNC × 1, SMPTE timecode (525/59.94) or EBU timecode (625/50)
0.5 V p-p to 18 V p-p, 3.3 kΩ, unbalanced

i.LINK HDV/DV:
6-pin IEEE 1394 connector × 1

OUTPUT

VIDEO OUT:
BNC × 3
Composite
Y/CPST: 1.0 V p-p, 75 Ω, negative sync
Component (SD)
Y/CPST: 1.0 V p-p, 75 Ω, negative sync
Pr/R-Y/S-C and Pb/B-Y/S-Y: 0.7 V p-p (75% color bars for 525/59.94 or 100% color bars for 625/50),75 Ω
Component (HD)
Y: 1.0 V p-p, 75 Ω, negative sync
Pr, Pb: 0.7 V p-p, 75 Ω
S-video
Pb/B-Y/S-Y: 1.0 V p-p, 75 Ω, negative sync
Pr/R-Y/S-C: 0.286 V p-p (525/59.94) or 0.3 V p-p (625/50), 75 Ω (burst level)
Monitor video output
BNC × 1
(SUPER) CPST: 1.0 V p-p, 75 Ω, negative sync

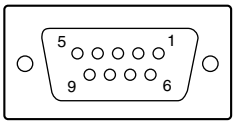
SDI OUT:
BNC × 2
Serial digital interface format (270 Mbps), SMPTE 259M/ITU-R BT.656

HD-SDI OUT:	BNC × 2 Serial digital interface format (1.485, 1.485/1.001 Gbps), SMPTE 292M
AUDIO OUT:	XLR 3-pin × 2, MALE +4/0/−3*/−6 dBu, 600 Ω loading, low impedance, balanced *: For 625/50 only
MONITOR AUDIO:	Phono jack × 1 −∞ to −11 dBu ±1 dB (−20 dBFS) /−9 dBu ±1 dB (−18 dBFS), 47 kΩ, unbalanced
PHONES:	Stereo phone jack × 1 −∞ to −13 dBu (−20 dBFS) /−11 dBu (−18 dBFS), 8 Ω, unbalanced
AUDIO I/O (AES/EBU) :	BNC × 2 Complying with AES-3id-1995
TC OUT:	BNC × 1 SMPTE timecode (525/59.94), EBU timecode (625/50) 2.2 V p-p ±3 dB (when 600 Ω terminated) , unbalanced
i.LINK HDV/DV:	6-pin IEEE 1394 connector

Remote control connectors

CONTROL-S:	Stereo minijack × 1
i.LINK HDV/DV:	6-pin IEEE 1394 connector

REMOTE (D-sub 9-pin : MALE)



– EXT VIEW –

Pin No.	Controlling Device	Controlled Device
1	FRAME GROUND	FRAME GROUND
2	RECEIVE A	TRANSMIT A
3	TRANSMIT B	RECEIVE B
4	TRANSMIT COMMON	RECEIVE COMMON
5	PRIORITY IN	PRIORITY OUT
6	RECEIVE COMMON	TRANSMIT COMMON
7	RECEIVE B	TRANSMIT B
8	TRANSMIT A	RECEIVE A
9	FRAME GROUND	FRAME GROUND

1-7. Installation Setup and Adjustment

1-7-1. Front Panel Setting

Front panel

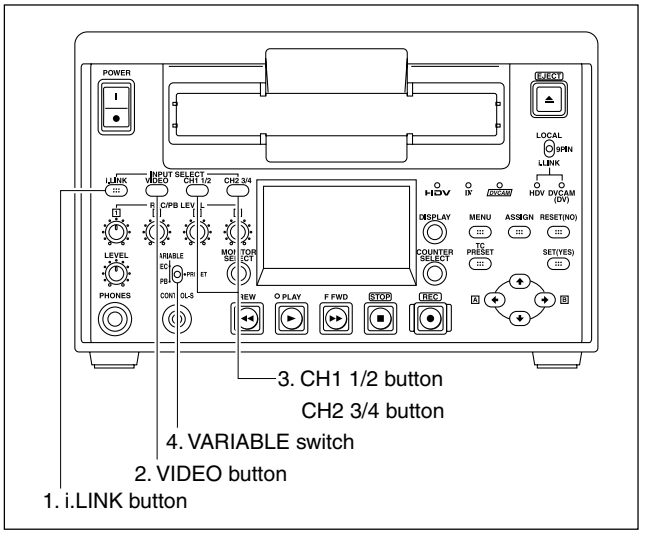
1. i.LINK INPUT SELECT button setting
   - i.LINK : HDV: Video and audio signals in HDV format
   - i.LINK : DV*: Video and audio signals in DV format
   - i.LINK : DVCAM*: Video and audio signals in DVCAM format
   - *: The display follows the recording format setting in the REC FORMAT menu item. (Refer to the operating instructions for details)

2. VIDEO INPUT SELECT button setting
   - COMPOSITE: Composite video signal (When HVBK-1505 is attached)
   - S VIDEO: S-video (separated Y and C) signals (When HVBK-1505 is attached)
   - COMPONENT SD: Component video signals (When HVBK-1505 is attached)
   - SDI: SDI video signal
   - SG: Video test signal

3. AUDIO INPUT SELECT button setting
   - ANALOG: Analog audio signal (When HVBK-1505 is attached)
   - AES/EBU: Digital audio signal in AES/EBU format
   - SDI: Digital audio signal in SDI format
   - SG: Audio test signal

4. AUDIO VARIABLE switch setting
   - PRESET : Sets both the REC and PB levels to the normal level.
   - REC : Sets the REC audio level of the channels respectively with the CH-1/2/3/4 knobs.
   - PB : Sets the PB audio level of the channels respectively with the CH-1/2/3/4 knobs.

Layout of switch and buttons on the front panel



1-7-2. System Adjustment After Installation

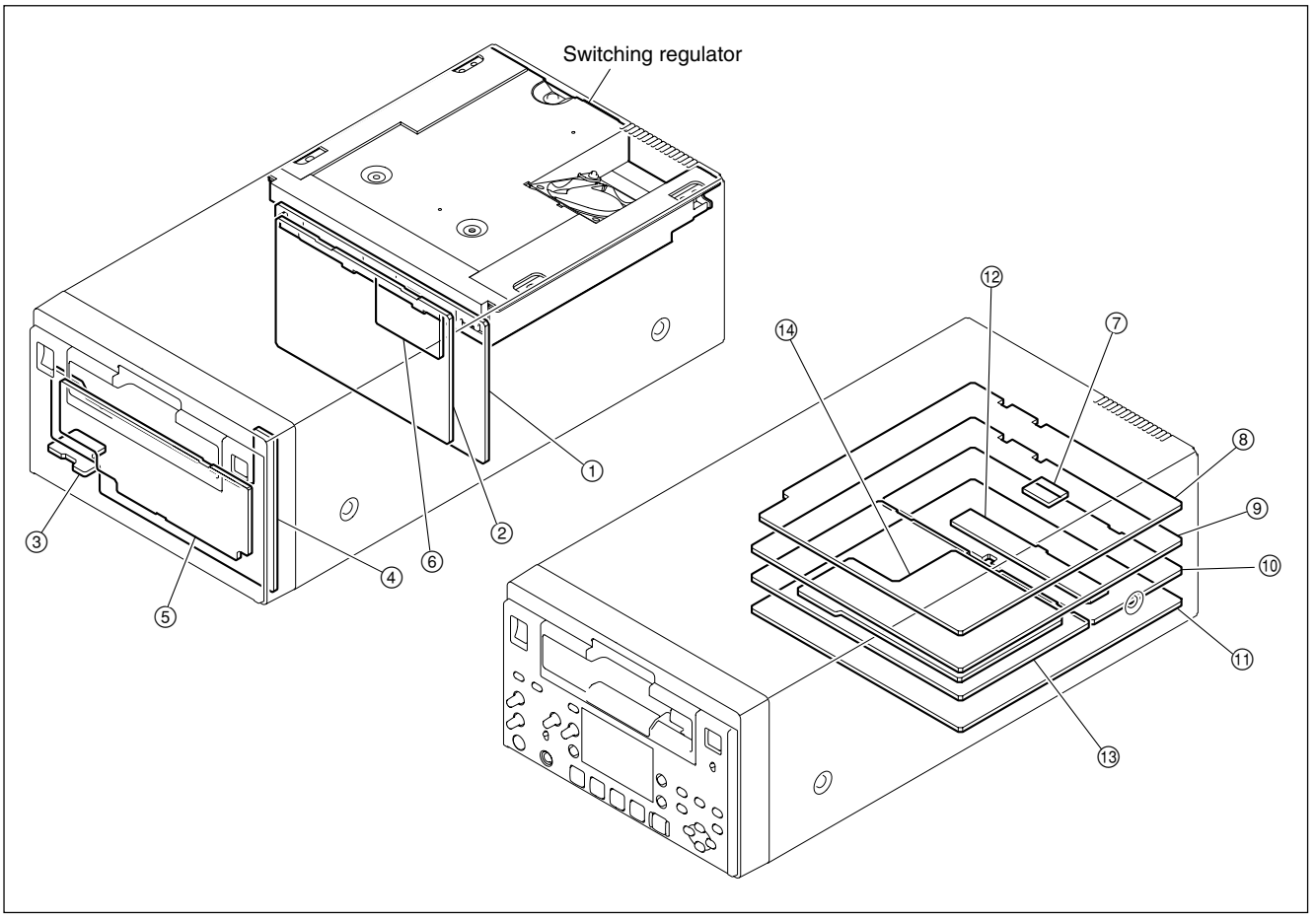
Observe the following precautions when this equipment is used for editing system.

- The REF. VIDEO IN requires video signal which is in conformity with the RS-170A (525/60).
- Adjust the sync phase of this equipment to the system sync with [SYNC PHASE] control of the setup menu.
- Adjust the SCH phase of this equipment to the system SCH with [SUB CARRIER] control of the setup menu.
- When this unit is connected to a switcher that does not have the sync switching function, the SYNC/BURST level adjustment is required.

Section 2
Service Overview

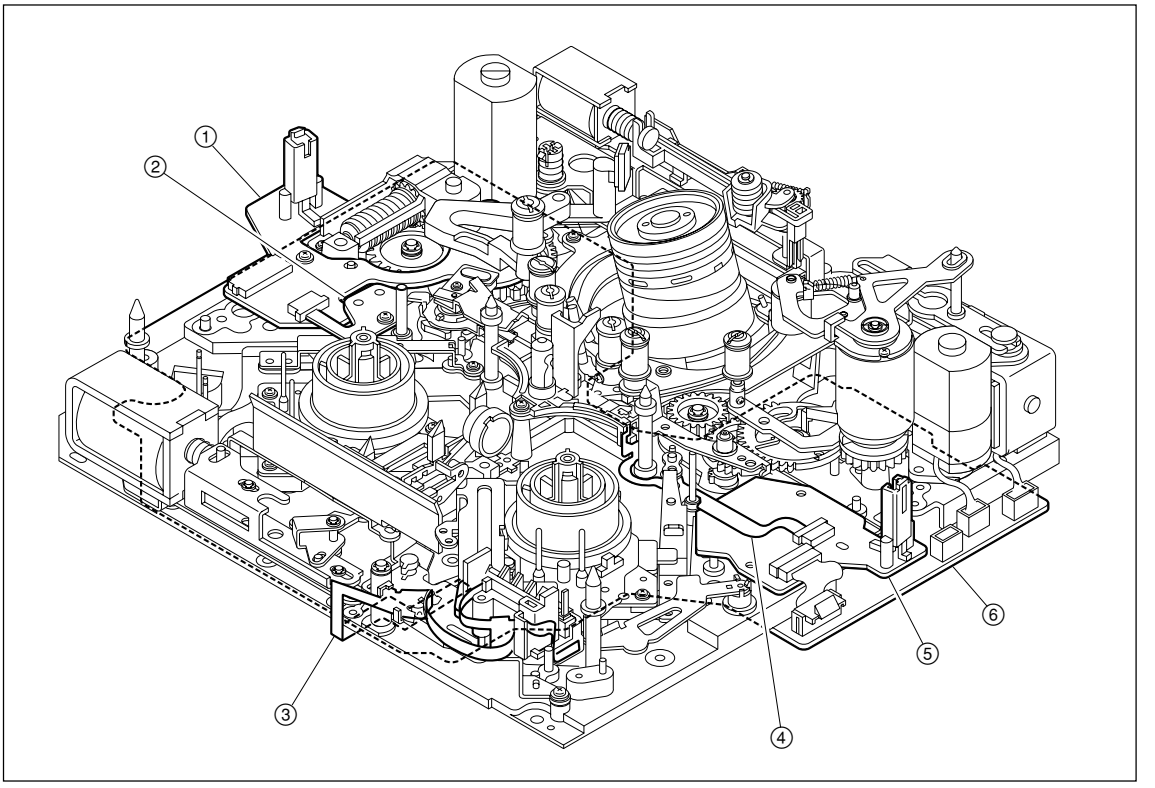
2-1. Location of Main Parts

2-1-1. Location of Printed Circuit Boards



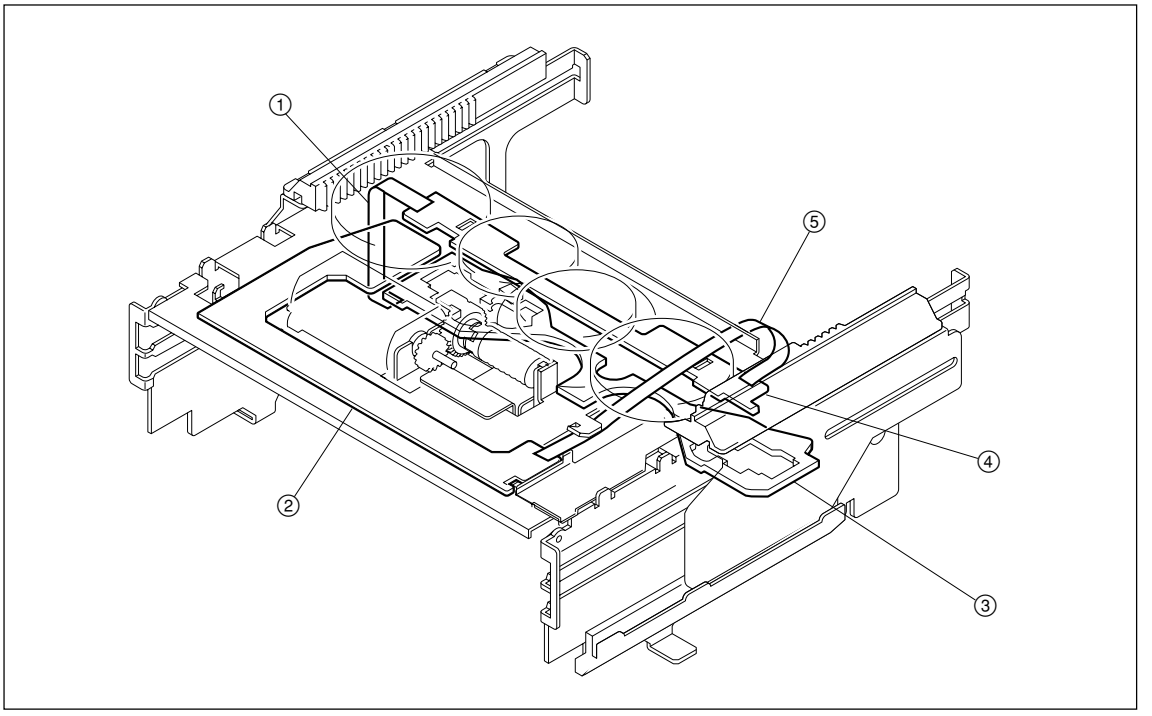
	Board name	Circuit function
①	MB-1098	Motherboard
②	RP-133	RF REC/PB, ATF Detection
③	HP-136	Headphone, Remote Control
④	KY-614	Key Board
⑤	KY-616	Graphics Renderer
⑥	RT-10	HDV Equalizer
⑦	CN-1968A	HDV/DV Connector Board
⑧	DDE-22 (HVBK-1505)	Analog Video/Audio Input Board
⑨	AVP-7	Analog Video/Audio Output Board
⑩	SDI-94	Digital Input/Output Board
⑪	SSS-12	System/Servo Control
⑫	CN-2905	Intermediate Board
⑬	DVP-42	DV Video/Audio Digital Process
⑭	HPR-20	HDV Video/Audio Digital Process

Locations of mechanism deck



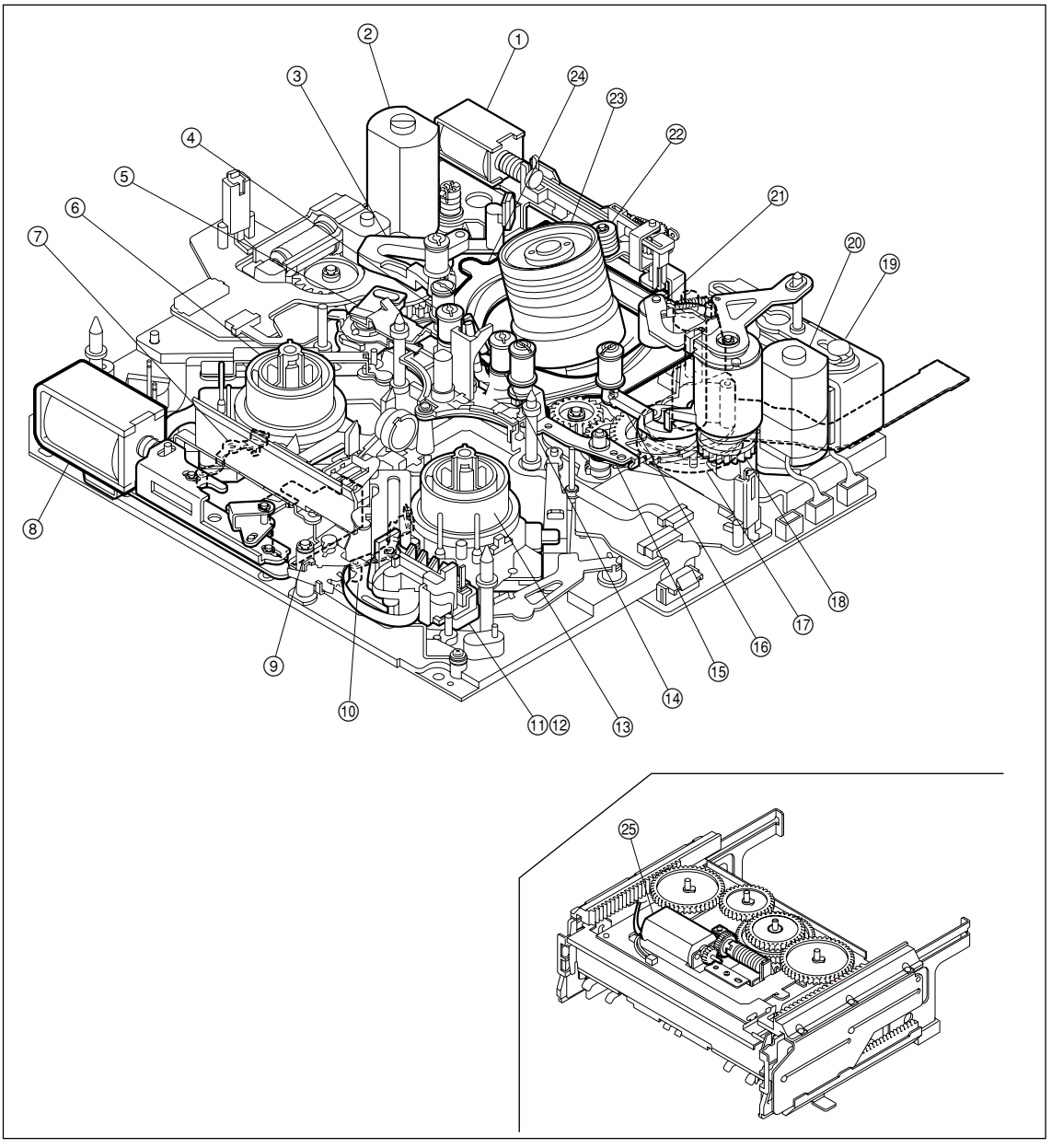
	Board name	Circuit function
①	SE-521G	Threading Mode Sensor, Tape End Sensor, Loading Motor FG Sensor
②	SE-538G	Tension Sensor
③	CN-1863	REC INHIBIT Sensor, MIC Terminal
④	SE-525G	Tape Top/End LED
⑤	SE-522G	Tape Top Sensor, Reel Position Sensor
⑥	DR-428BG	Drum/Reel/Capstan Control Board

Locations of cassette compartment



	Board name	Circuit function
①	CN-2021G	Intermediate Board
②	CC-83G	Cassette Compartment Mode Detection, Intermediate Board
③	CC-85G	Cassette In Detection
④	CC-84G	Cassette Type Detection
⑤	CN-2022G	Intermediate Board

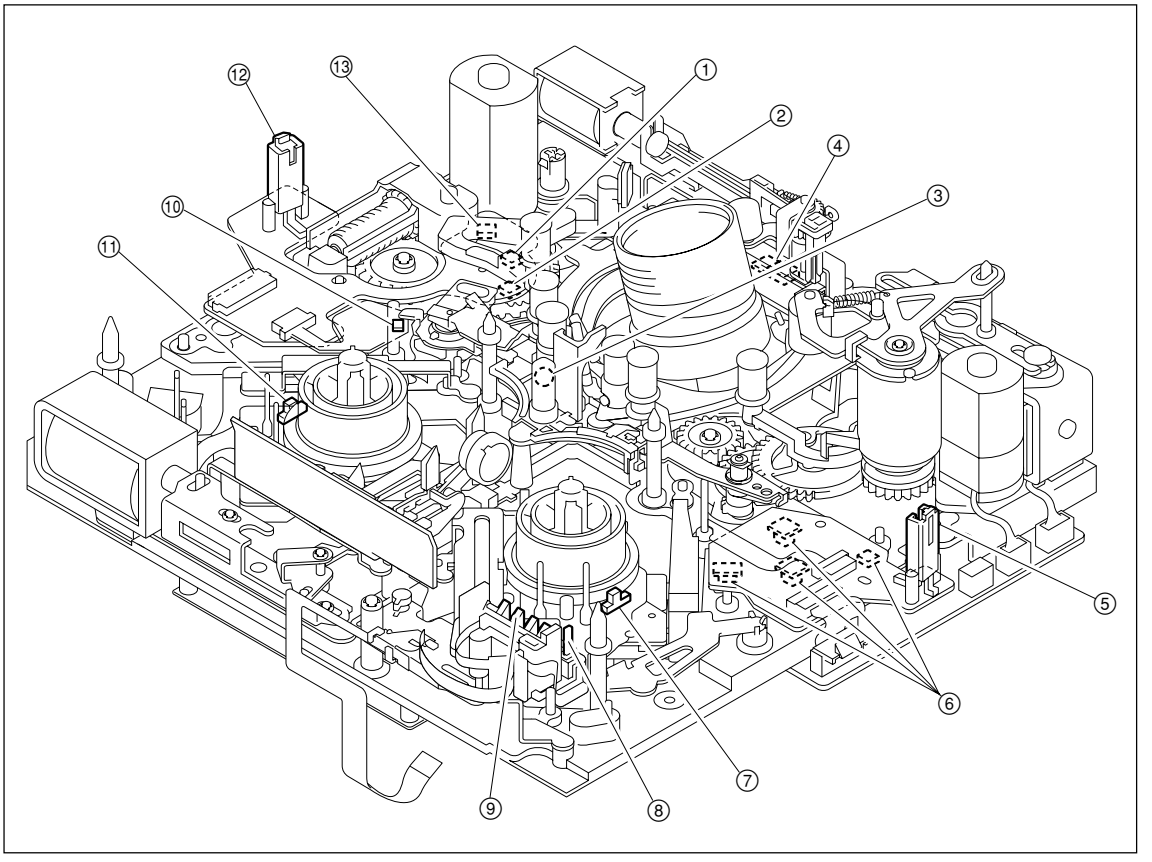
2-1-2. Location of Main Mechanical Parts



① Head cleaning solenoid
② Loading motor
③ TG1 arm assembly
④ Shuttle (left) assembly
⑤ S tension regulator assembly
⑥ S reel motor
⑦ S brake assembly
⑧ Brake solenoid
⑨ M stop solenoid assembly
⑩ T brake assembly
⑪ MIC assembly
⑫ MIC holder assembly
⑬ T reel motor
⑭ Shuttle (right) assembly
⑮ T drawer arm assembly
⑯ TG8 arm assembly
⑰ Capstan motor
⑱ Elevator cam
⑲ Pinch solenoid assembly
⑳ Reel shift motor
㉑ Pinch roller
㉒ HC roller assembly
㉓ Drum assembly
㉔ Rail assembly
㉕ Cassette compartment motor assembly

2-2. Function and Location of Sensors

(1) Mechanism deck



①, ② Mode sensor
Detects the mechanism position during threading.

③ Tape top/end detect LED
Detects the top and end of a tape.

④ Condensation sensor
Detects condensation occurred in DSR-1500/1500P.

⑤ Tape top sensor
Detects the beginning of a tape that runs in the REV direction.

⑥ Reel position sensors (4 pieces) (Mini, M, Standard reel position)
Detects the reel table position at the each specified reel position according to the cassette type.

⑦ Reel FG sensor (Take-up side)
Detects rotation of the take-up reel table. The FG output of the sensor is sent to the servo circuit and used to control the rotating speed and torque of the reel motor.

⑧ Record proof sensor (common to standard, M and mini size cassettes)
Protects a tape from mis-recording.

⑨ Cassette memory terminal
Determines whether cassette memory is used, and reads and writes data to and from the cassette memory.

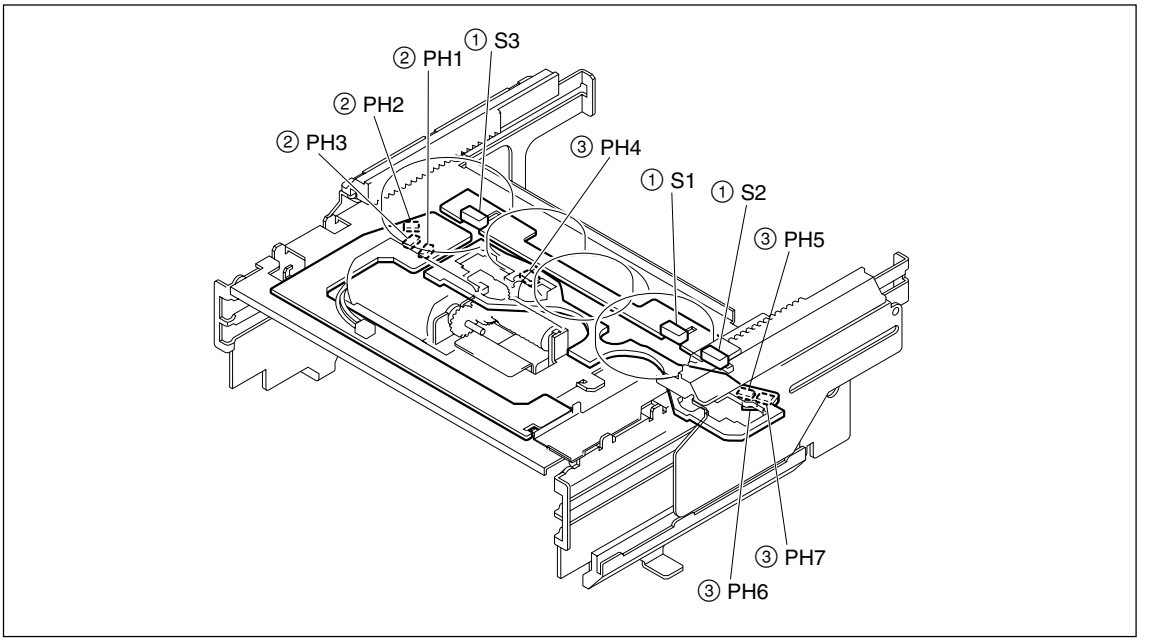
⑩ Tension sensor
The tension arm keeps the tension of a running tape constant during recording and playing. The tension sensor detects the mechanical position of the tension arm.

⑪ Reel FG sensor (Supply side)
Detects the rotation of the supply reel table. The PG output of the sensor is input to the servo circuit and controls the rotating speed and torque of the reel motor.

⑫ Tape end sensor
Detects the end of a tape that runs in the FWD direction.

⑬ Threading motor FG sensor
Detects the rotation speed of the gearbox motor. The FG output of the sensor is input to the servo circuit and controls the threading speed so that excessive force is not applied to the tape during threading.

(2) Cassette compartment



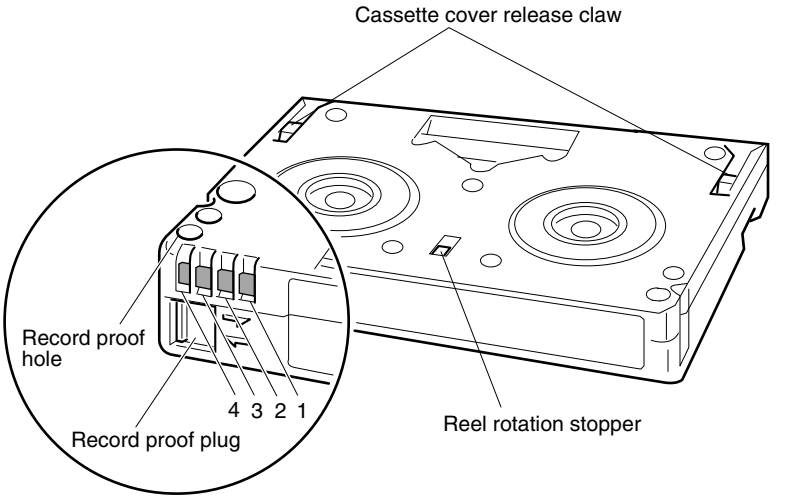
① The sensors S1, S2 and S3 discriminate the inserted cassette type among the mini, M, standard cassettes and the cassette adaptor for DVCPRO by on/off of the sensors.

② The sensors PH1, PH2 and PH3 detect the movement of a cassette compartment by their combination.

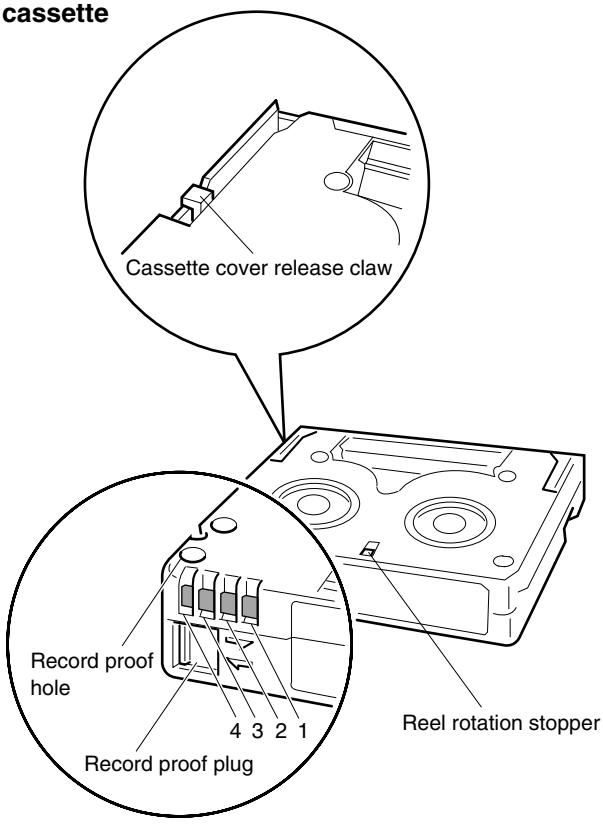
③ The sensors PH4 and PH5 detect that a mini cassette got inserted.
The sensors PH4 and PH6 detect that a M cassette got inserted.
The sensors PH4 and PH7 detect that a standard cassette got inserted.

2-3. Functions of Cassette

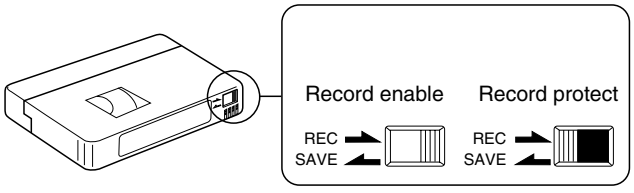
Standard cassette, M cassette



Mini cassette



Hole and plug for record proof



• This plug controls the record proof switch according to open or close position.

Pin No.	Function	
	Equipped with built-in memory	**Not equipped with built-in memory**
1	+DC	Detecting tape thickness
2	DATA	Detecting tape type (Example: ME/MP)
3	CLOCK	Detecting tape application (Example: consumer/professional)
4	GND	–

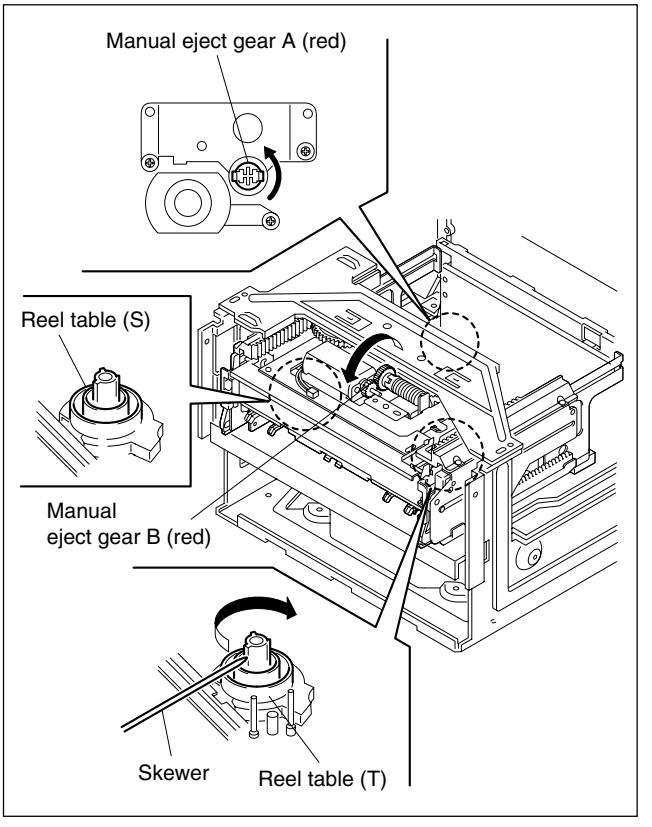
2-4. How to Take Out the Cassette Whose Tape is Slacked (MANUAL EJECT)

(1) Turn the power off.
(2) Remove the top panel. (Refer to Section 2-7-1.)
(3) Remove the front panel. (Refer to Section 2-7-3.)
(4) Turn the manual eject gear A (red) in the arrow direction with a phillips screwdriver while pressing the gear. When the tape comes to slack, turn the reel table from the front side utilizing a skewer and wind the tape.

Note

In a case of standard cassette and M cassette :
Turn the reel table (T)
In a case of mini cassette :
Turn the reel table (S)

(5) Repeat step (4) until each guide comes to the unthreading end position and furthermore the tape completely returns into the cassette.
(6) Turn the manual eject gear B (red) in the arrow direction until the cassette compartment completely comes into cassette out state.



2-5. Head Cleaning when Head Clogging Occurs

Clean the video head as follows when the video head gets dirty.

Procedure to Use the Cleaning Cassette

Note

Use only the cleaning cassette tape as follows.
If another cleaning cassette tape is used, abnormal abrasion or breakage of the video head could occur.

Cleaning cassette tapes :
PDV12CL (Standard)
PDVM12CL (Mini)

1. Insert the specific cleaning cassette tape in this unit. The unit is automatically set in the PLAY mode and the cleaning tape starts running.
   Confirm that the PLAY key lights and the display appears.
2. The cleaning cassette tape is automatically ejected after running for 10 seconds.

   Note

   Do not rewind the cleaning cassette tape to use it again.

3. Make sure that the head is no longer dirty.
   If the video head is still dirty after step 2 above, clean the video head as follows.

Procedure to Use the Cleaning Cloth

1. Soak the cleaning cloth with cleaning liquid and bring it into contact lightly with the video head.
2. Turn the upper drum slowly by hand in the rotating direction of the head (counterclockwise when viewed from the top) to clean the video head.

Notes

- Never move the cleaning cloth in the vertical direction against the video head because it may break the head.
- Turn the power switch off when cleaning the video head.

2-6. Operating the VTR without a Cassette Tape

The VTR can be operated without a cassette tape by the following switch setting.

Switch Setting

1. Remove the cassette compartment from this unit.
2. Turn on switches S401-4 of the SSS-12 board.
3. Then turn on the main power.

Operating Method

Threading

While pressing the S/T reel motors, press the STOP key.
The upper drum rotates, threading ring rotates. The unit enters the threading mode.
The tension arm and the threading ring move to the specified position, then the threading is completed.
This condition in which the threading is completed is referred to as the STOP status.

PLAY

Press the PLAY key.
The pinch roller is pressed against the capstan shaft to enter the PLAY status.
When the PLAY key is pressed during threading, the pinch roller is pressed against the capstan shaft to enter the PLAY status after the threading has completed.

FF

Press the F FWD key.
The pinch roller is pressed against the capstan shaft to set the FWD.SEARCH to five-times speed.

REW

Press the REW key.
The pinch roller is pressed against the capstan shaft to set REV.SEARCH to five-times speed.

REC

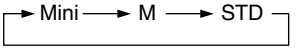
While pressing the record proof sensor on the right side of the T side reel table, press both the PLAY key and the REC key.
The pinch roller is pressed against the capstan shaft to enter REC status.
When the record proof sensor is released, the REC status is released and the recorder returns to PLAY status.

Unthreading

Press the EJECT key.
Each guide moves to the specified position to complete the unthreading.

Reel position selection

Press the SET (YES) key on the control panel.
Reel position will be changed as shown below in accordance with the number of pressing the SET (YES) key.



Note

Make sure to turn off switches S401-4 on the SSS-12 board after the adjustment.

2-7. Removing/Installing the Cabinets

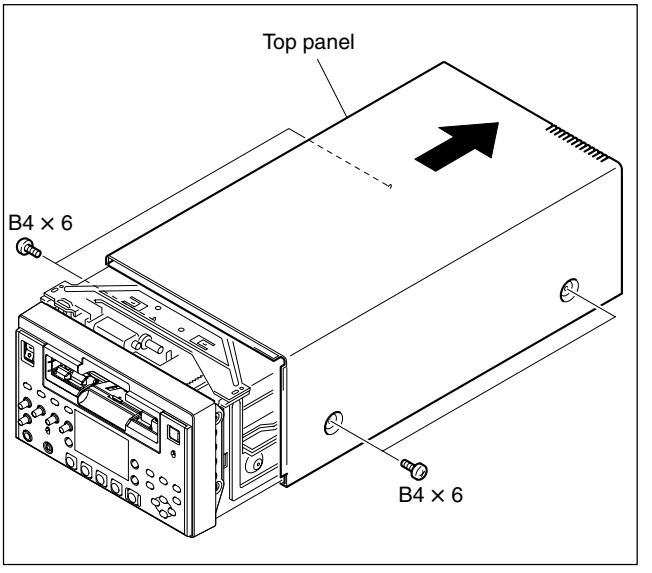
Note

Before removing the cabinets, be sure to turn off the main power.

2-7-1. Removal/Installation of the Top Panel

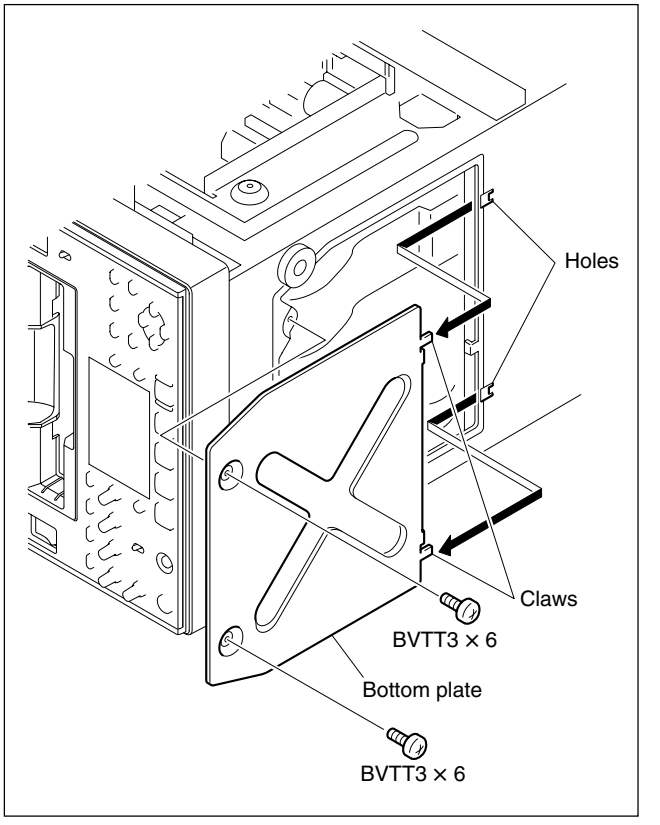
1. Remove the four screws and remove the top panel in the direction of the arrow.
   Note
   Be careful not to break or peel off the internal packing.

2. Re-attach the parts in reverse order of the disassembling procedure.



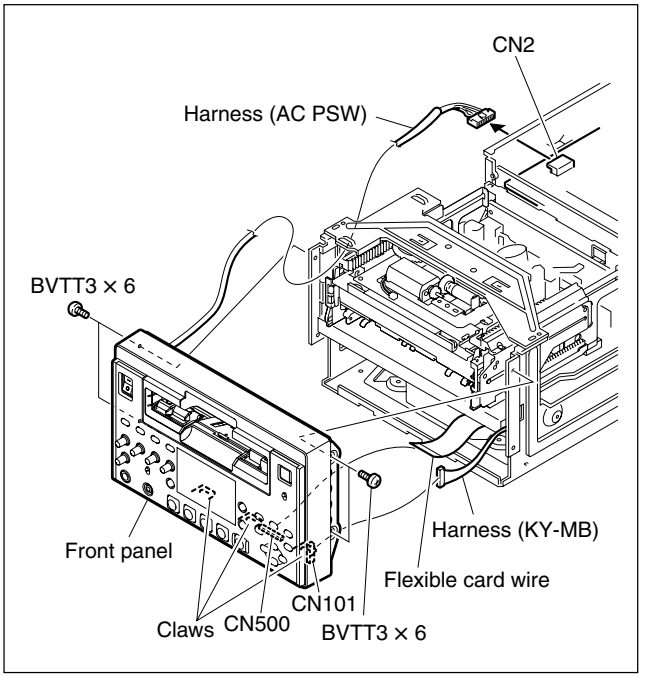
2-7-2. Removal/Installation of the Bottom Plate

1. Stand the main unit on the left side.
2. Remove the two screws and remove the bottom plate in the direction of the arrow.
3. Re-attach the parts in reverse order of the disassembling procedure.



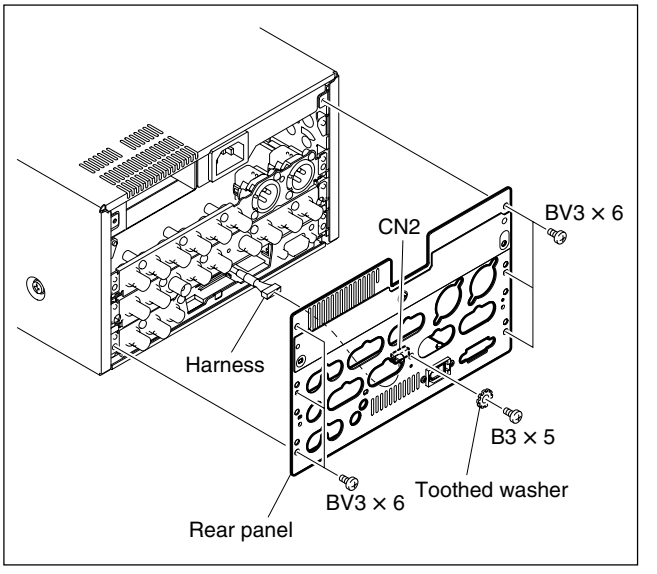
2-7-3. Removal/Installation of the Front Panel

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the bottom plate.
   (Refer to Section 2-7-2.)
3. Remove the harness (AC PSW) from the connector (CN2) on the switching regulator.
4. Remove the flexible card wire from the connector (CN500) on the KY-616 board.
5. Remove the harness (KY-MB) from the connector (CN101) on the KY-614 board.
6. Remove the four screws.
7. Pull the front panel to the front to remove it.
8. Re-attach the parts in reverse order of the disassembling procedure.



2-7-4. Removal/Installation of the Rear Panel

1. Remove the screw (B3 × 5) and toothed washer.
2. Remove the six screws (BV3 × 6) , and remove the rear panel.
3. Remove the harness from the connector (CN2) on the CN-1968A board.
4. Re-attach the parts in reverse order of the disassembling procedure.



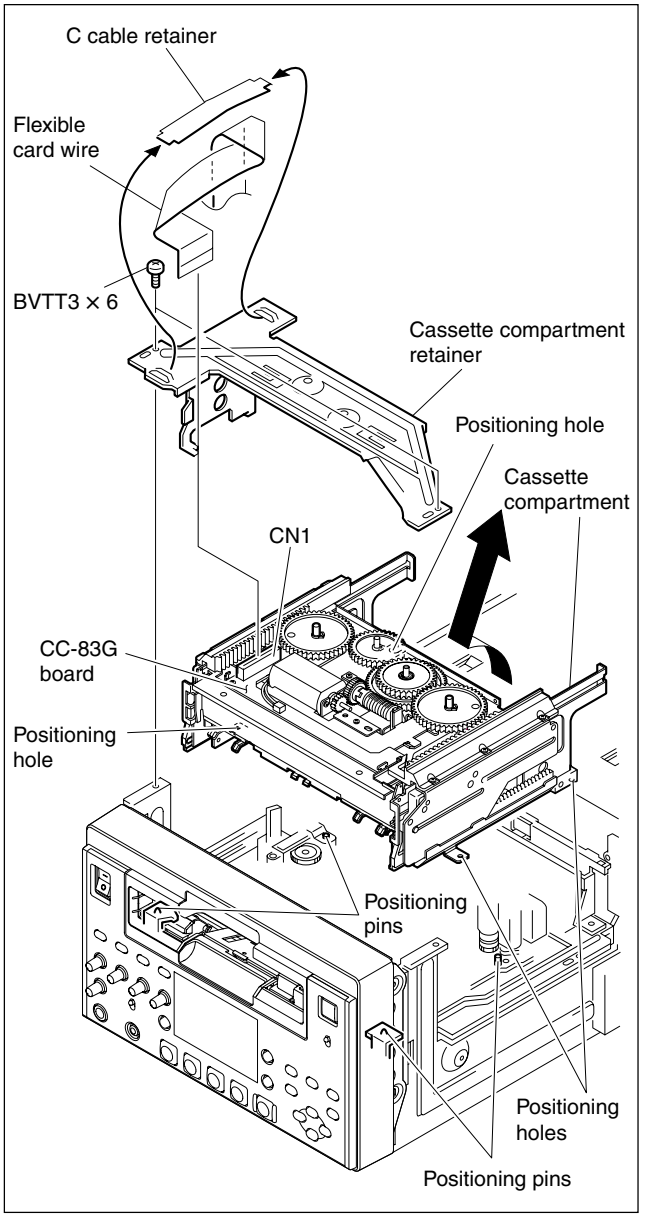
2-8. Removing/Installing the Cassette Compartment

Removal

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the C cable retainer.
3. Remove the flexible card wire from the connector (CN1) on the CC-83G board.
4. Remove the two screws and remove the cassette compartment retainer.
5. Remove the cassette compartment n the direction of the arrow.

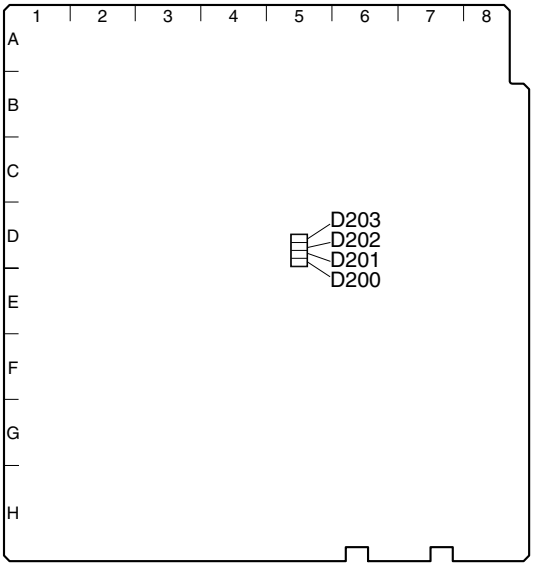
Installation

1. Put in the cassette compartment in the opposite direction of the arrow and align the four positioning holes with the four positioning pins.
2. Attach the cassette compartment with the two screws.
3. Connect the flexible card wire to the connector (CN1) on the CC-83G board.
4. Attach the C cable retainer.
5. Attach the top panel. (Refer to Section 2-7-1.)



2-9. Function of Indicators on Circuit Boards

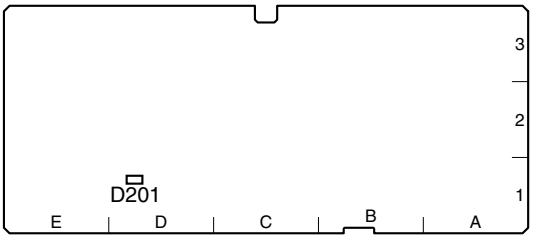
DDE-22 Board



A side (component side)

Ref. No.	Name	Color	Description	Normal state
D200	NON INTER	Green	Blinks in case of non-interlace signal.	OFF
D201	NON STD	Green	Blinks, except for a standard signal.	OFF
D202	VCXO SC LOCK	Red	Lights in case of standard signal	OFF
D203	VCXO H LOCK	Red	Off in case of standard signal	Lights

SDI-94 Board



A side (component side)

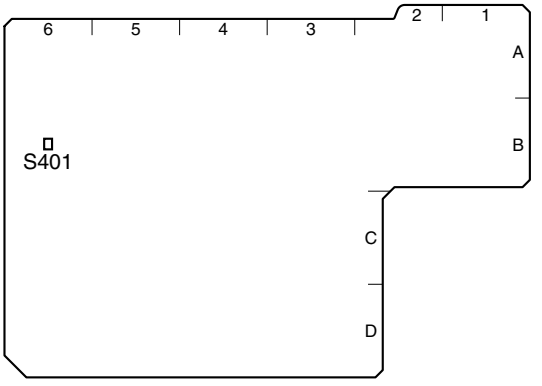
Ref. No.	Name	Color	Description	Normal state
D201	UNLOCK	Red	Lights when SDI output signal is unlock.	OFF

2-10. Switch Setting on Circuit Boards

Note

Do not change the setting of switches when the “Factory use” is shown in the description.

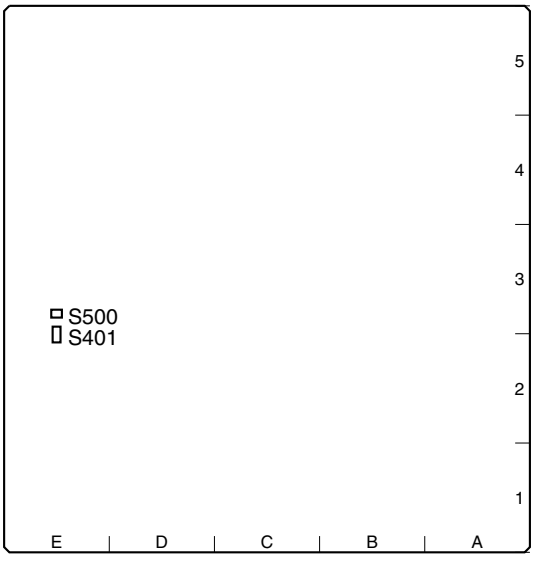
HPR-20 Board



A side (component side)

Ref. No.	Name	Description	Factory setting
S401	—	Factory use	ALL OFF

SSS-12 Board



A side (component side)

Ref. No.	Name	Description	Factory setting
S401	—	Factory use	ALL OFF
S500	RESET	Push this switch when resetting the system control.	—

2-11. Circuit Protection Parts (Fuse/IC Link)

Circuit Protection Element

This unit is equipped with the positive characteristics thermister(s) (power thermister) as the circuit protection element. The positive characteristics thermister limits the electric current flowing through the circuit as the internal resistance increases when an exces-sive current flows or when the ambient temperature increases.
If the positive characteristics thermister works, turn off the main power of the unit and inspect the internal circuit of this unit. After the cause of the fault is removed, turn on the main power again. The unit works normally.
It takes about one minute to cool down the positive characteristics thermister after the main power is turned off.

Board	Ref. No. (Address)	Part No.
CN-1968A	THP1 (A-1/Side A)	⚠ 1-805-726-11
	THP2 (A-1/ Side A)	⚠ 1-805-726-11
	THP3 (A-1/ Side A)	⚠ 1-805-726-11
	THP4 (A-1/ Side A)	⚠ 1-805-726-11

Fuse/IC Link

WARNING

The fuse and IC link are essential parts for safe operation. Replace the components with Sony parts whose part numbers appear in the manual published by Sony. If the components are replaced with any parts other than the specified ones, this may cause a fire or electric shock.

This unit is equipped with Fuse(s) and IC link(s).
An excessive current flows due to abnormality inside the equipment, the fuse and/or IC link blow. If they blow, turn off the main power of the equipment, inspect inside of the equipment, and remove the cause of excessive current. After that, replace the fuse and/or IC link.

Board	Ref. No. (Address)	Part No./Name
AVP-7	F51 (D-8/Side A)	⚠ 1-533-804-21 Fuse 2.5 A, 125 V
	PS51 (C-8/Side A)	⚠ 1-533-282-21 IC link 2 A, 72 V
	PS52 (C-8/Side A)	⚠ 1-533-282-21 IC link 2 A, 72 V
	PS53 (C-8/Side A)	⚠ 1-533-282-21 IC link 2 A, 72 V
	PS54 (C-8/Side A)	⚠ 1-533-282-21 IC link 2 A, 72 V
	PS55 (E-9/Side A)	⚠ 1-533-282-21 IC link 2 A, 72 V
DDE-22	PS300 (A-4/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
	PS301 (A-4/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
	PS302 (A-5/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
	PS303 (A-2/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
DR-428BG	PS1 (E-2/Side A)	⚠ 1-576-123-21 IC link 0.8 A, 72 V
	PS2 (E-2/Side A)	⚠ 1-576-123-21 IC link 0.8 A, 72 V
	PS3 (F-2/Side A)	⚠ 1-576-123-21 IC link 0.8 A, 72 V
	PS4 (E-2/Side A)	⚠ 1-576-123-21 IC link 0.8 A, 72 V
DVP-42	PS1301 (A-3/Side B)	⚠ 1-576-677-21 IC link 4 A, 72 V
	PS1302 (A-3/Side B)	⚠ 1-533-282-21 IC link 2 A, 72 V
	PS1303 (A-3/Side B)	⚠ 1-533-282-21 IC link 2 A, 72 V
	PS1304 (A-4/Side B)	⚠ 1-533-282-21 IC link 2 A, 72 V
KY-614	PS100 (E-3/Side B)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
	PS101 (E-3/Side B)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
	PS102 (E-3/Side B)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
	PS103 (E-3/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
	PS104 (E-3/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
RP-133	PS101 (B-3/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
	PS102 (B-3/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
	PS103 (B-3/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
SSS-12	PS102 (C-5/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
	PS103 (C-5/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
	PS104 (C-5/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V
	PS105 (C-5/Side A)	⚠ 1-576-282-21 IC link 1.2 A, 72 V

2-12. Replacing NV-RAM and Memory Backup Battery

(1) Overview

This unit is provided with a batter backed RAM and EEPROMs on the boards.
These memory devices store system setup data, adjustment data, and other data.
When any of these devices or the backup battery is replaced, the memory data must be rewritten.

Board	Ref. No.	Type	Stored data
AVP-7	IC156	EEPROM	AVP BOARD ADJ adjustment value of maintenance menu
DR-428BG	IC8	EEPROM	Hours meter data Serial number data Error log data Mechanical deck adjustment value
KY-616	IC300	EEPROM	LCD ADJ adjustment value of maintenance menu
RP-133	IC501	EEPROM	RP adjustment value of maintenance menu
SSS-12	IC538	RAM (with backup battery)	SYSTEM SEL setting data of setup menu Input/output setting data
	IC539	EEPROM	Setup menu data Menu bank 1-3 data

(2) Replacing Memory Backup Battery (IC538/ SSS-12 board)

A backup battery is attached to IC538 on the SSS-12 board.

WARNING

When replacing the part, be sure to use the specified one below.

Use of an unspecified part may result in burst, fire or heating.

Replacement part

Model: M4Z28BR00SH1

Part No.: ⚠1-528-749-12

Recommended replacement cycle:

About 6 years

Note

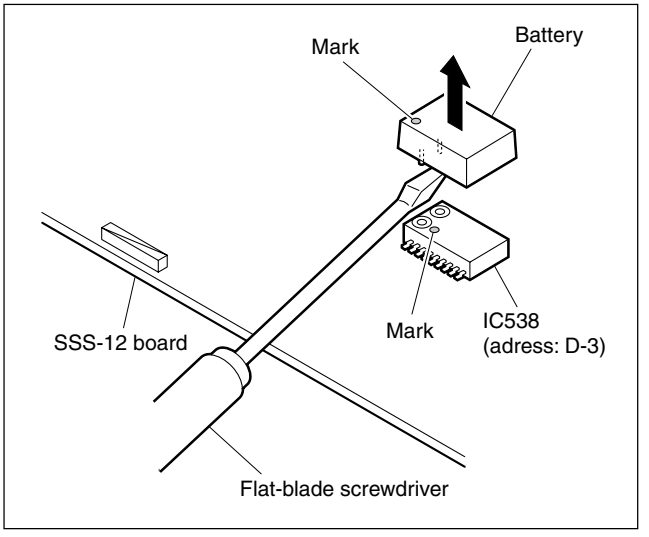
When becoming replacement time, displays an error message to monitor screen and counter display. (For details, refer to the operating instructions.)

Replacement

Note

When replacing the battery, install a new battery in correct orientation of the mark.

1. Turn off the power of the unit.
2. Remove the SSS-12 board. (Refer to Section 6-26-1.)
3. Insert a flat-blade screwdriver between the battery and IC538 and detach the battery.



4. Install a new battery matching its mark with the mark on IC538.
5. Install the SSS-12 board.
6. Restart the unit.
7. The alarm is displayed, the setup menu is saved.

(3) Replacing EEPROM (IC156/AVP-7 board)

1. Turn off the power of the unit, and then remove the AVP-7 board. (Refer to Section 6-26-1.)
2. Replace IC516 (A-8/side A).
3. Install the AVP-7 board, and then turn on the power of the unit.
4. Perform the video adjustment. (Refer to Section 8-3.)

(4) Replacing EEPROM (IC8/DR-428BG board)

Note

Even if this EEPROM is replaced in the field, no data can be initialized. When you need to replace this EEPROM, contact your local Sony Sales Office/Service Center.

(5) Replacing EEPROM (IC300/KY-616 board)

1. Turn off the power of the unit, and then remove the KY-616 board. (Refer to Section 6-26-10.)
2. Replace IC300 (C-1/side A).
3. Install the KY-616 board, and then turn on the power of the unit.
4. Perform the LCD adjustment. (Refer to Section 8-5.)

(6) Replacing EEPROM (IC501/RP-133 board)

1. Turn off the power of the unit, and then remove the RP-133 board. (Refer to Section 6-26-12.)
2. Replace IC501 (A-3/side A).
3. Install the RP-133 board, and then turn on the power of the unit.
4. Perform the RP adjustment as follows. (Refer to Section 4-3-6.)
   - PLL F0
   - EQ AUTO ADJ
   - EQ MANUAL ADJ
   - REC CURRENT
   - FE CHECK

(7) Replacing NV-RAM (IC538/SSS-12 board)

Replace IC538, after detaching the battery. The other replacement steps are the same as those in (2) Replacing Memory Backup Battery (IC538/SSS-12 board).

(8) Replacing EEPROM (IC539/SSS-12 board)

1. Turn off the power of the unit, and then remove the SSS-12 board. (Refer to Section 6-26-1.)
2. Replace IC539 (E-5/side A).
3. Install the SSS-12 board.
4. Turn on the power of the unit while pressing the MENU, SET, and RESET keys simultaneously.
5. Press the SET key, and initialize the EEPROM.

2-13. Equipment and Fixtures List for Check/Adjustment

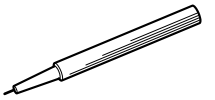
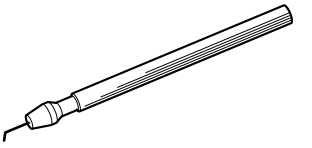
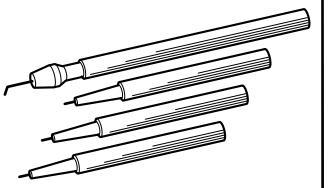
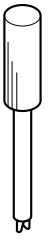
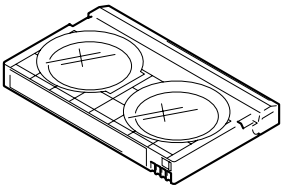
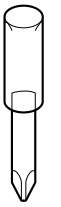
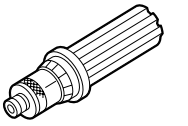
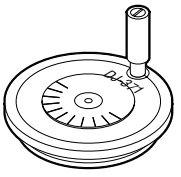
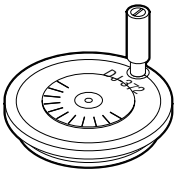
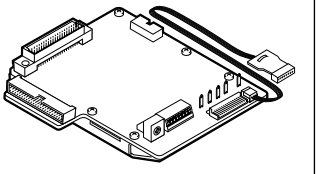
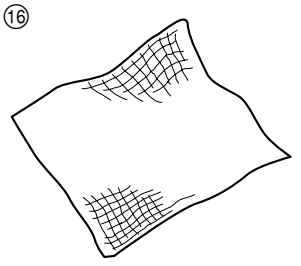
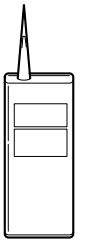
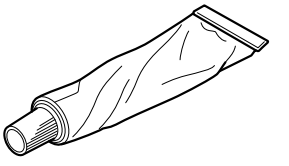
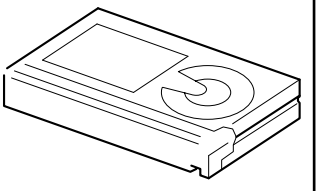
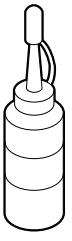
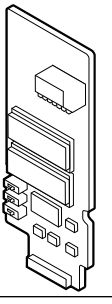
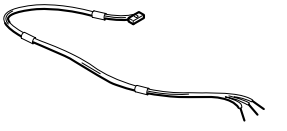
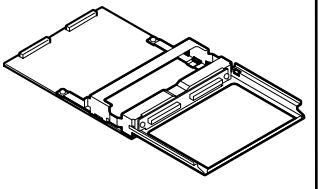
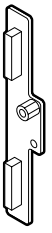
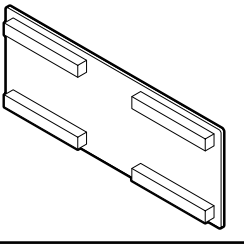
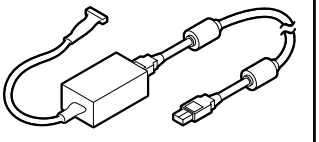
2-13-1. Equipment for Check/Adjustment

It is recommended to use the equipment listed below or the equivalents.
Each equipment listed below is available as a standard product. However, it may not be producted now.

Equipment	Model name	Remarks
Oscilloscope	Tektronix TDS460A	
Video signal generator	Tektronix TSG-130A	For 60i mode
	Tektronix TSG-131A	For 50i mode
Waveform monitor	Tektronix 1750A	
Audio level meter	Agilent Technologies HP3400A	
Frequency counter	Advantest TR5821	

2-13-2. Fixtures and Tools

Fig.	Part No.	Description	Uses
①	J-6080-029-A	Small adjustment mirror	Video tracking adjustment
②	J-6082-231-A	Washer mounting fixture (ø1.5)	Parts replacement
③	J-6082-232-A	Washer mounting fixture (ø1.2)	Parts replacement
④	J-6082-233-A	Washer mounting fixture (ø0.8)	Parts replacement
⑤	J-6082-234-A	Washer extracting fixture A	Parts replacement
⑥	J-6082-236-A	Washer fixture kit	Parts replacement (Set of ② to ⑤)
⑦	J-6082-362-A	Tape guide adjustment driver	Tape guide height adjustment
⑧	J-6082-373-A	Torque cassette	FWD/REV winding torque adjustment
⑨	J-6325-110-A	Torque screwdriver‘s bit (M1.4)	Parts replacement
⑩	J-6325-380-A	Torque screwdriver’s bit (M2)	Parts replacement
⑪	J-6325-400-A	Torque screwdriver (3 kg)	Tightening screws
⑫	J-6443-710-A (CCW)	Brake torque gauge (CCW) (DJ-371)	Brake torque adjustment
⑬	J-6443-720-A (CW)	Brake torque gauge (CW) (DJ-372)	Brake torque adjustment
⑭	J-6444-610-B	Path adjustment board (DJ-461)	For tape path adjustment RF envelope detector fixture
⑮	J-6444-720-A	Path adjustment board connection cable (DJ-472)	Tape path adjustment
⑯	3-184-527-01	Cleaning cloth	Cleaning
⑰	7-432-114-11	Locking compound	Locking compound
⑱	7-662-001-39	Grease SG-941(20g)	Parts replacement
⑲	8-967-999-02	Alignment tape XH2-1AST	Tape path alignment (60i & 50i)
⑳	8-967-999-22	Alignment tape XH5-1A2 (NTSC)	Tape path alignment (60i) Audio/video alignment (DVCAM for 60i)
	8-967-999-26	Alignment tape XH5-1AP2 (PAL)	Tape path alignment (50i) Audio/video alignment (DVCAM for 50i)
㉑	8-967-999-31	Alignment tape XH4-1A (NTSC)	Audio/video alignment (DV for 60i)
㉒	9-919-573-01	Cleaning fluid	Cleaning
㉓	J-6444-970-A	System control/Servo download tool board (DJ-497)	Software version-up
㉔	J-6445-000-A	Path tool power supply cable (DJ-500)	Tape path adjustment
㉕	J-6445-160-A	Extension board (DJ-516)	Extension board for plug-in board
㉖	J-6445-170-A	Extension board (DJ-517)	Extension board for KY board
㉗	J-6445-180-A	Extension board (DJ-518)	Extension board for switching ragulator
㉘	J-7120-220-A	USB download cable	For writing of config ROM/PLD data

①	② ③ ④ 	⑤ 	⑥ 
⑦ 	⑧ 	⑨ ⑩ 	⑪ 
⑫ 	⑬ 	⑭ 	⑮
⑯ 	⑰ 	⑱ 	⑲ ⑳ ㉑ 
㉒ 	㉓ 	㉔ 	㉕ 
㉖ 	㉗ 	㉘ 	

2-14. Alignment Tapes

XH5-1A2 (8-967-999-22) (for 60i)

Recording contents are followings.

VIDEO	TIME CODE (h) (m) (s)	REC (s)	AUDIO		
Black Burst	23 : 59 : 00	60	No Signal		
75 % Full Color Bars	00 : 00	60	1 kHz		
60 % Multi Burst	01 : 00	60	20 Hz		
Bowtie with Mod 12.5T	02 : 00	30	14.5 kHz		
Shallow Ramp	02 : 30	30	10 kHz		
	03 : 00	30	No Signal		32 kHz
Cross Hatch (index)	03 : 30	30	1 kHz 0 dBFS		4 ch
Line 17	04 : 00	40	1 ch	1 kHz	
75 % Full Color Bars	04 : 40	40	2 ch		
Quad Phase	05 : 20	40	3 ch		
	06 : 00	40	4 ch		
Black Burst	06 : 40	5	No Signal		
	06 : 45	5			48 kHz
60 % Multi Burst (for Composite)	06 : 50	60	1 kHz		2 ch
Mod 12.5T	07 : 50	30	20 Hz		
Shallow Ramp (B-Y/R-Y OFF)	08 : 20	30	20 kHz		
	08 : 50	30	10 kHz		
Cross Hatch (index)	09 : 20	30	1 kHz 0 dBFS		
Chroma Noise	09 : 50	30	1 kHz		
Line 17	10 : 20	30			
75 % Full Color Bars	10 : 50	180			
60 % Multi Burst	13 : 50	60			
Mod 12.5T	14 : 50	30			
Shallow Ramp	15 : 20	60			
75 % Full Color Bars	16 : 20	100			
75 % Full Color Bars (R-Y OFF)	18 : 00	180			
75 % Full Color Bars (B-Y OFF)	21 : 00	180			
Blanking Marker	24 : 00	180			
Line 17 (R-Y OFF)	27 : 00	180			
Line 17 (B-Y OFF)	30 : 00	180			

∗ Audio levels are –20 dBFS (Reference), except 1 kHz 0 dBFS part.

XH5-1AP2 (8-967-999-26) (for 50i)

Recording contents are followings.

VIDEO	TIME CODE (h) (m) (s)	REC (s)	AUDIO		
Black Burst	23 : 59 : 00	60	No Signal		
100 % Full Color Bars	00 : 00	60	1 kHz		
60 % Multi Burst	01 : 00	60	20 Hz		
Bowtie with Mod 10T	02 : 00	30	14.5 kHz		
Shallow Ramp	02 : 30	30	10 kHz		
	03 : 00	30	No Signal		32 kHz
Cross Hatch (index)	03 : 30	30	1 kHz 0 dBFS		4 ch
Line 17	04 : 00	40	1 ch	1 kHz	
100 % Full Color Bars	04 : 40	40	2 ch		
Quad Phase	05 : 20	40	3 ch		
	06 : 00	40	4 ch		
Black Burst	06 : 40	5	No Signal		
	06 : 45	5			
60 % Multi Burst (for Composite)	06 : 50	60	1 kHz		
Mod 10T	07 : 50	30	20 Hz		
Shallow Ramp (B-Y/R-Y OFF)	08 : 20	30	20 kHz		
	08 : 50	30	10 kHz		
Cross Hatch (index)	09 : 20	30	1 kHz 0 dBFS		
Chroma Noise	09 : 50	30	1 kHz		48 kHz 2 ch
Line 17	10 : 20	30			
100 % Full Color Bars	10 : 50	180			
60 % Multi Burst	13 : 50	60			
Mod 10T	14 : 50	30			
Shallow Ramp	15 : 20	60			
100 % Full Color Bars	16 : 20	100			
100 % Full Color Bars (R-Y OFF)	18 : 00	180			
100 % Full Color Bars (B-Y OFF)	21 : 00	180			
Blanking Marker	24 : 00	180			
Line 17 (R-Y OFF)	27 : 00	180			
Line 17 (B-Y OFF)	30 : 00	180			

∗ Audio levels are −18 dBFS (Reference), except 1 kHz 0 dBFS part.

2-15. Tools for Board Extension

The three sets of extension tools as follows are used for maintenance.

For Plug-in Board

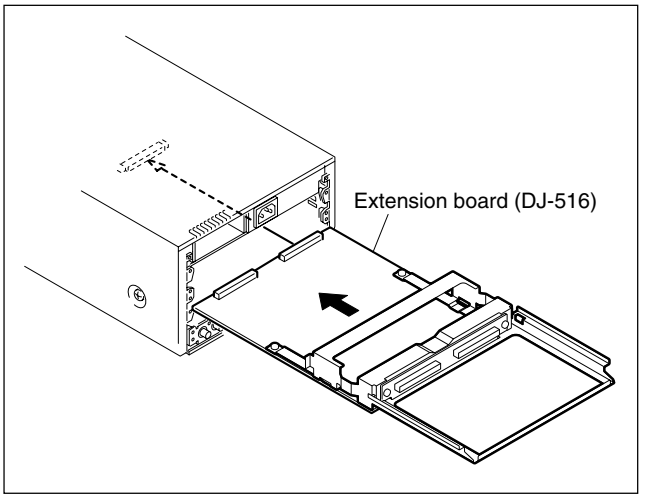
Used for extending the plug-in board.
Description: Extension board (DJ-516)
Sony part No.: J-6445-160-A

Extending procedure

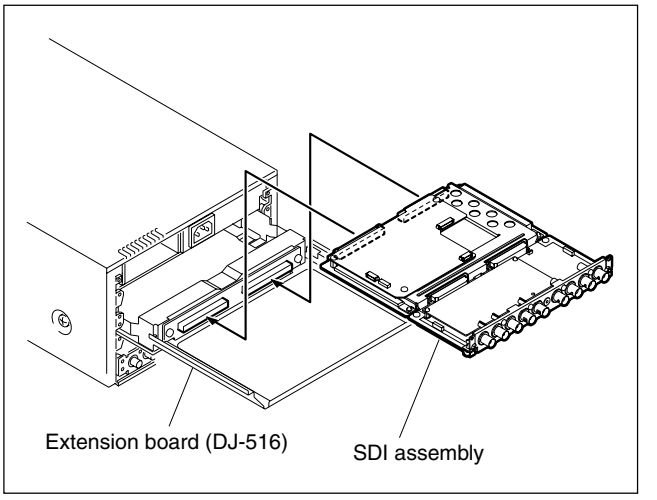
1. Turn off the power.
2. Remove the rear panel. (Refer to Section 2-7-4.)
3. Remove the extending plug-in board.

Plug-in board	Reference section
AVP-7	6-26-1
DDE-22	6-26-4
SDI assembly (SDI-94, DVP-42, HPR-20, CN-2905)	6-26-1
SSS-12	6-26-1

4. Attach the extension board (DJ-516) to the main unit as shown below.



5. Attach the plug-in board to be extended to the extension board as shown below.

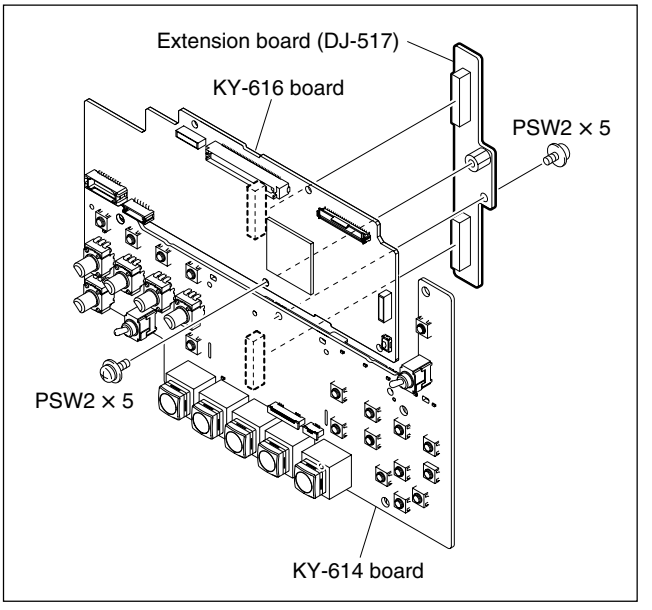


For KY Board

Used for extending the KY-614 and KY-616 board.
Description: Extension board (DJ-517)
Sony part No.: J-6445-170-A

Extending procedure

1. Turn off the power.
2. Remove the front panel. (Refer to Section 2-7-3.)
3. Remove the KY-616 board.
   (Refer to Section 6-26-10.)
4. Remove the KY-614 board. (Refer to Section 6-26-9.)
5. Attach the extension board (DJ-517) with the screw that tightens the KY-614 and KY-616 board.



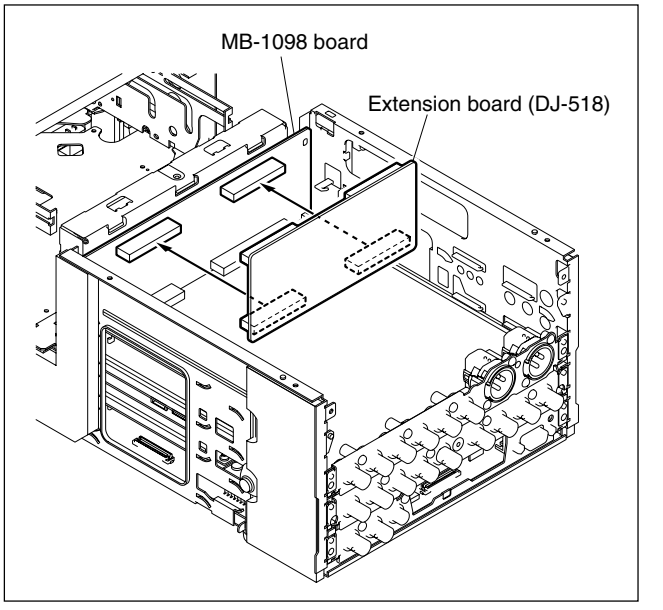
6. Connect the harness (KY-MB) to the connector (CN101) on the KY-614 board.
   (Refer to Section 2-7-3.)
7. Connect the flexible card wire to the connector (CN500) on the KY-616 board.
   (Refer to Section 2-7-3.)
8. Connect the harness (AC PSW) to the connector (CN2) of the switching regulator.
   (Refer to Section 2-7-3.)

For Switching Regulator

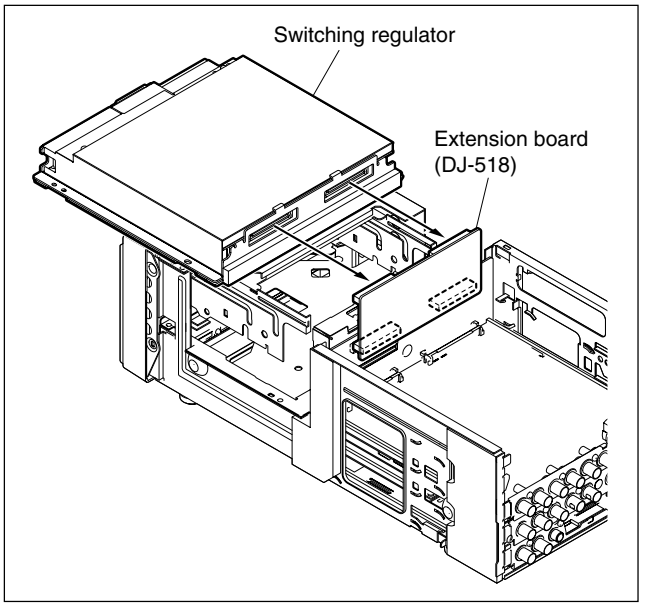
Used for extending the switching regulator.
Description: Extension board (DJ-518)
Sony part No.: J-6445-180-A

Extending procedure

1. Turn off the power.
2. Remove the switching regulator. (Refer to Section 6-26.)
3. Attach the extension board (DJ-518) to the main unit as shown below.



4. Turn back the switching regulator, and attach the switching regulator as shown below.
5. Connect the harness (AC PSW) to the connector (CN2) of the switching regulator. (Refer to Section 2-7-3.)



2-16. Writing and Rewriting the PLD Internal Data

This unit uses the PLD (Programmable Logic Device).
Writing and rewriting the PLD internal data shown below supported by the e-Production (EPR) system.
If the PLD needs to be upgraded, contact your Sony Sales Office/Service Center.

e-Production system has the advantages shown below.

- To write/rewrite the PLD internal data:
  1. The standard fixture (cable) can be used.
  2. The standard software (PLD Download Tool) can be used.
- The PLD internal data is controlled in the Sony Database Server under the name Project file (E_xxx_xxx_xx_xx).
- The printed circuit board is equipped with the standard connector (EPR connector) to write the PLD internal data. The indication “EPR” is shown on the printed circuit board.

PLD supported by the e-Production

Board	EPR connector Ref. No.	PLD Ref. No.	Project File No.
AVP-7	CN2	IC154	E_000_003_71_xx
DDE-21	CN200	IC202	E_000_003_66_xx
DVP-42	CN901	IC805, IC10012	E_000_003_69_xx
		IC805	E_000_003_67_xx
		IC1001	E_000_003_68_xx
HPR-20	CN1201	IC1203	E_000_003_70_xx
KY-616	CN501	IC507	E_000_003_74_xx
RT-10	CN201	IC200	E_000_003_75_xx
SDI-94	CN701	IC705	E_000_003_72_xx
	CN601	IC601	E_000_003_73_xx
SSS-12	CN401	IC401	E_000_003_65_xx

Equipment required

- USB download cable
  (Sony part number: J-7120-220-A)
  The cable connected PC to this unit.
- PC
  A PC having USB port.
  A PC in which the PLD Download Tool software is already installed.
  For the applicable OS and the operating environment, refer to “Download Tool Operating Instruction for Device Programming”.

Data write procedure

Data write procedure in the PLD is outlined below.
For details of data write procedure, refer to “Download Tool Operating Instruction for Device Programming” which is available in the same site where the PLD Download Tool software is available.

1. Prepare the Project file.
   Note
   Download the Project file from the Sony Database Server.

2. Turn off the power of this unit. Connect the PC USB port to the EPR connector of the target board using the USB download cable.
3. Turn on the power of this unit.
   Start the Download Tool software and read the Project file.
4. Program the PLD with the Download Tool software.
5. Upon completion of programming, check that error message is not displayed. Turn off the power of this unit and back on.

2-17. Firmware Update

The HVR-1500 mounts the CPU for SY and SV on the SSS-12 board and uses flash ROMs for loading this program.
Do the following procedure to upgrade the version of the flash ROMs mounted on the board.
There are two methods of the upgrading the flash ROMs.
(1) High-speed writing using the fixture board, J-6444-970-A (DJ-497)
(2) Writing by downloading from a PC (through RS-422)

2-17-1. Upgrading the Version Using the Fixture Board

1. Setting the fixture board DJ-497

Write the CPU software to be written into the following PROMs.
ROMs to be used on the fixture DJ-497:
SV CPU M27C4001-10F1-(G) (8-759-568-73) or equivalent
SY CPU M27C4001-10F1-(G) (8-759-568-73) or equivalent
As these CPUs employ 16 bits data bus, 2 pieces of PROMs are required for one CPU.
Write softwares into PROMs in the 8 bit split mode. A PROM at even address side is for CN102.
A PROM at odd address side is for CN101.

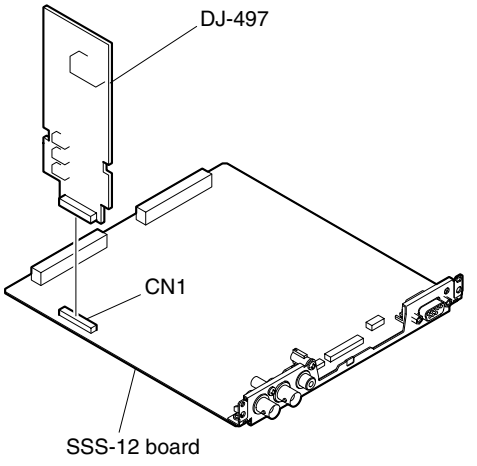
(1) Insert the PROMs, in which CPU software are written, into the socket on the fixture board DJ-497.
(2) Set bit 1 of S1 on the fixture DJ-497 to OPEN (upper side) and the rest of bits to the board side (lower side).
(3) Set S3 on the fixture DJ-497 to ROM side and S2 on the fixture DJ-497 to DOWN side.
(4) Set S4 on the fixture DJ-497 to 8M.

2. How to upgrade

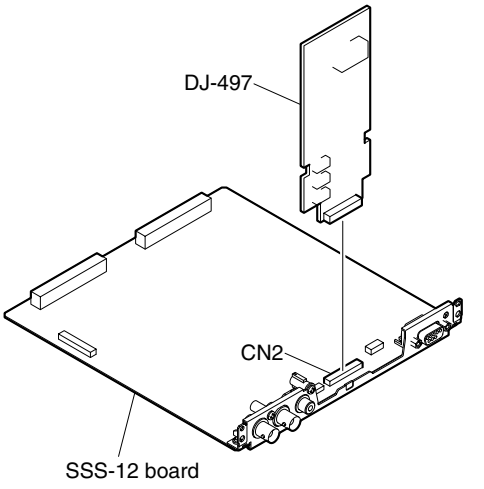
(1) Remove the top panel of the unit. (Refer to Section 2-7-1.)
(2) Extend the SSS-12 board with the extension fixture board DJ-516. (Refer to section 2-15.)
(3) Connect the fixture board DJ-497, in which the PROMs of the CPU software to be written are installed, as shown in the following figure.

CPU of software to be written	Target board to which DJ-497 is connected
SY CPU (IC501/SSS-12)	CN1/SSS-12
SV CPU (IC202/SSS-12)	CN2/SSS-12

When re-writing the SY CPU



When re-writing the SV CPU



(4) Turn on the power of the set. Then, writing starts.
While writing is being executed, the LEDs of the fixture DJ-497 show the status shown below.

D2 lights up.	ERASE is being executed.
D2 and D4 light up.	BLANKCHECK is being executed.
D3 lights up.	COPY is being executed.
D4 lights up.	VERIFY is being executed.

(5) When LED becomes the following, writing ends.

D1 blinks.	Normal termination of SY CPU processing.
D5 lights up.	Normal termination of SV CPU processing.

(6) Turn off the power switch of the unit and remove the fixture board.
(7) Turn on the power switch of the unit again and confirm the SOFTWARE version on the maintenance menu. (Refer to Section 4-3-8.)

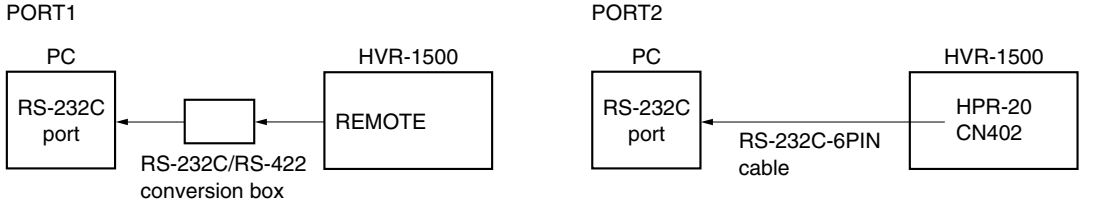
2-17-2. Version Upgrade from a PC through RS-422

1. Preparation

To convert the RS-232C of a PC to RS-422 (9 pin), use a conversion box or conversion board available on the market.

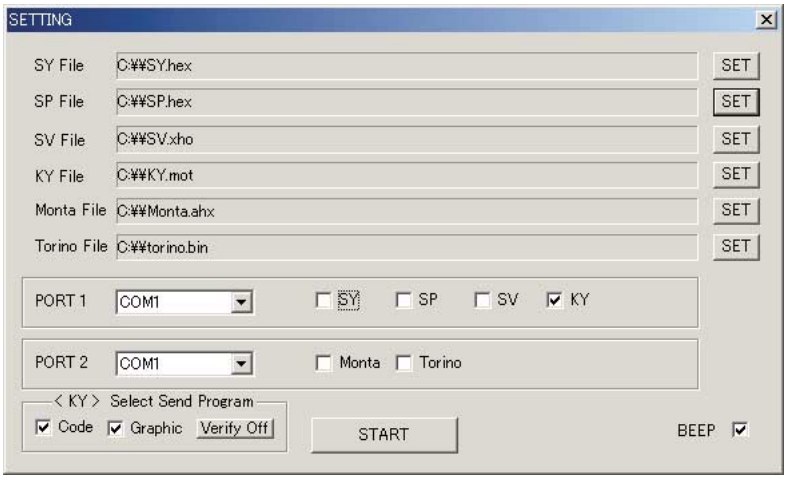
1) Install the version upgrade application software (CHANTA.EXE) on the PC on which Windows 2000 or XP is installed.
2) Download the version upgrade software of CPUs to be upgrade.

Connection



2. How to use CHANTA.EXE

Start up the CHANTA.EXE and then the main dialogue menu shown below appears.



The details of each button are as follows.

SET: Select the upgrade software file.
Selected filename appears.

PORT 1: Upgrade through the RS-232C → RS-422.
Select the upgrade software in the check box.
Only when KY is selected, < KY> Select Send Program is displayed.

PORT 2 : Upgrade with the RS-232C - 6PIN cable.

< KY > Select Send Program

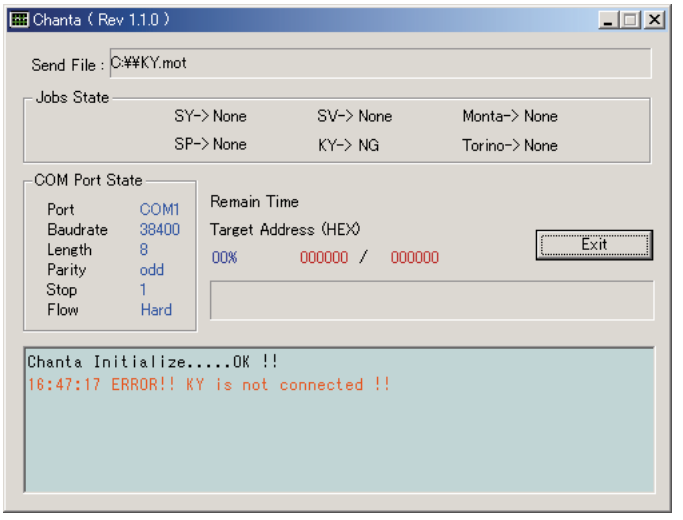
Code: Only software upgrade.

Graphic: Upgrade the LCD display data part.

Verify Off: Select the verify function at the software upgrade.

3. Operation

1. Connect the cable, and turn on the power.
2. Start the CHANTA.EXE.
3. Press the SET button, and select the CPU file.
4. Select the check box of the PORT.
5. Press the START button.
   The following screen is displayed, and the communication can be confirmed.



6. After the upgrade, the result is displayed on the screen.

Screen display

Normal termination		All jobs completed !!
	Only for KY	KY Automatically Restart. Please check the KY Version after Restart.
	Excluding KY	Please power OFF->ON and check version.
Abnormal termination	Monta	Monta-Flash ROM update failed !!
	Torino	Torino-Flash ROM update failed !!
	KY	KY-Flash ROM update failed !!
	SY	SY-Flash ROM update failed !!
	SP	SP-Flash ROM update failed !!
	SV	SV-Flash ROM update failed !!
	Excluding the above	Missing the target information !!

7. Press the Exit button, and CHANTA.EXE is ended.
8. Turn off the power of the unit, and disconnect the cable.
9. Turn on the power of the unit.
10. Confirm the version by the SOFWARE VERSION of the MAINTENANCE MENU.
    (Refer to Section 4-3-8.)

2-18. Internal Video Test Signal

VTR has the internal video test signal generator.

Note

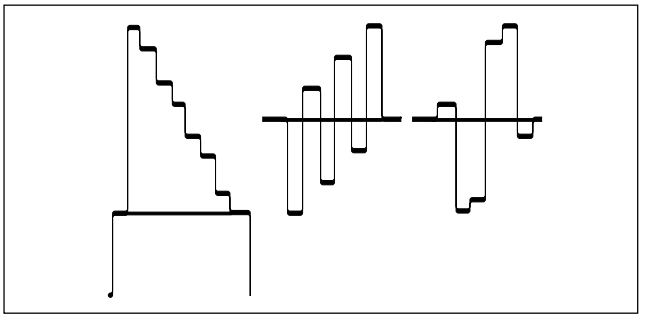
The test signals can be recorded on a tape.

- Setup menu
  INT VIDEO SG of the VIDEO CONTROL menu
  (For details, refer to the operating instructions.)

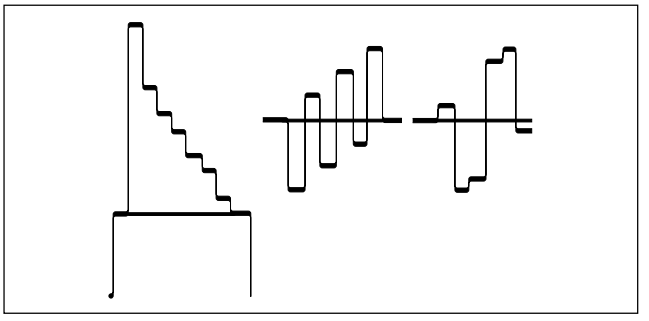
Describes output waveform figures of this generator below. These figures are drawn from waveforms that are watched SDI OUTPUT with the waveform monitor.

SD video test signals

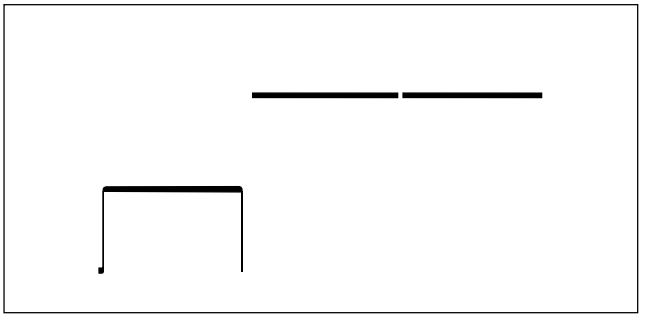
100 % Color Bars



75% Color Bars



Black Burst



2-19. Service Action after Replacing or Repairing the Board

No service action is required for the board other than below.

Board	Service action	Reference section
AVP-7	Video adjustment	8-3
DR-428BG	SERVO ADJUST	4-3-4
	TAPE PATH ADJUST	4-3-5
	Reset hours meter	5-2-2
	Setup menu data re-setting	Operating instructions
KY-616	LCD adjustment	8-5
RP-133	ELECTRICAL ADJUST PLL F0 EQ AUTO ADJ EQ MANUAL ADJ REC CURRENT FE CHECK	4-3-6
SSS-12	LOAD MENU DATA	4-3-1
	SERVO ADJUST	4-3-4

2-20. Removing/Installing Flexible Card Wire

The following six types of flexible card wire are used in the HVR-1500.

Note

Take utmost care when handling the flexible card wires because their life is extremely shortened by folding.

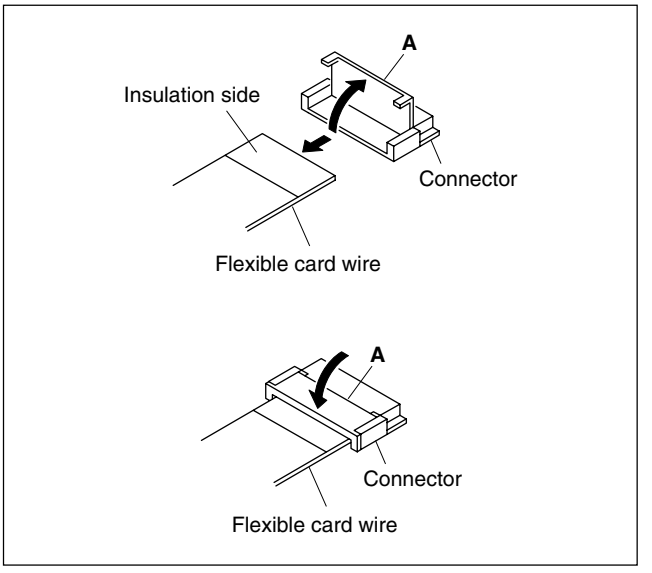
< Type A >

Removing method

Raise the portion marked "**A**" of the connector and release the lock. Pull out the flexible card wire.

Insertion method

Insert the flexible card wire fully up to the marked line and push up the portion marked "**A**" of the connector.



Note

The flexible card wire has the conduction side and the insulation side. Connect the flexible card wire after checking for the correct side as shown.
If the condition side and the insulation side are connected in the wrong direction, the circuit will not operate.

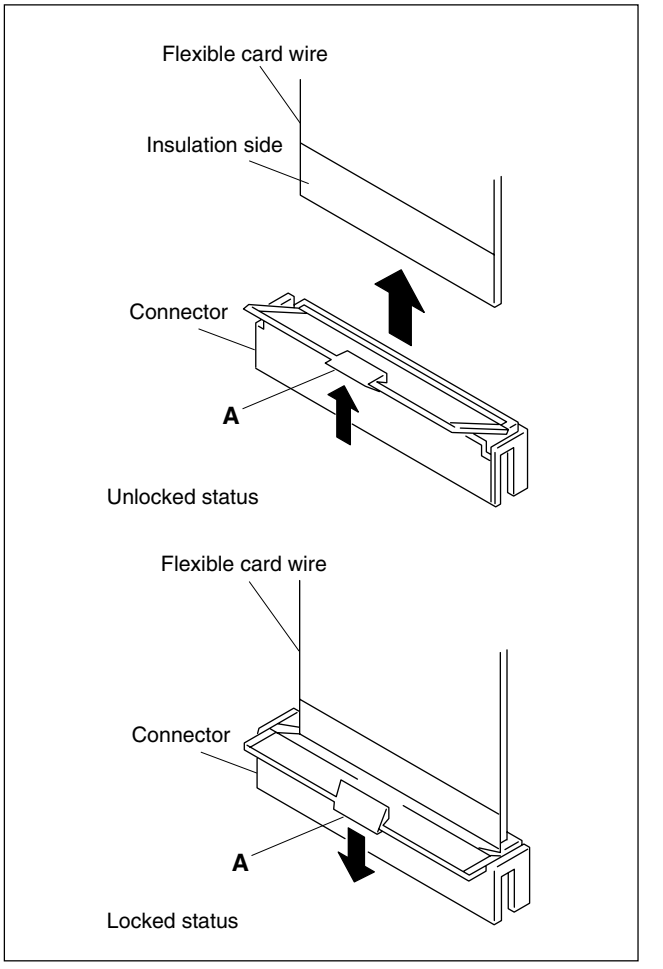
< Type B >

Removing method

Raise the portion marked "**A**" of the connector and release the lock. Pull out the flexible card wire.

Insertion method

Insert the flexible card wire fully up to the marked line and push up the portion marked "**A**" of the connector.



Note

The flexible card wire has the conduction side and the insulation side. Connect the flexible card wire after checking for the correct side as shown.
If the condition side and the insulation side are connected in the wrong direction, the circuit will not operate.

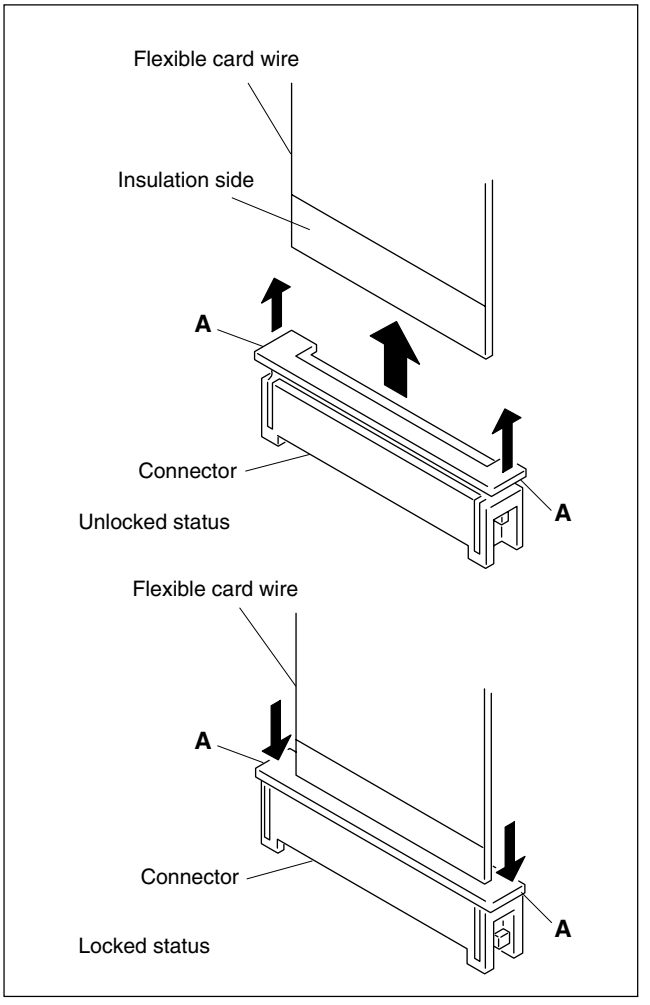
< Type C >

Removing method

Raise the portion marked "**A**" of the connector and release the lock. Pull out the flexible card wire.

Insertion method

Insert the flexible card wire fully up to the marked line and push up the portion marked "**A**" of the connector.



Note

The flexible card wire has the conduction side and the insulation side. Connect the flexible card wire after checking for the correct side as shown.
If the condition side and the insulation side are connected in the wrong direction, the circuit will not operate.

< Type D >

Removing method

Notes

- Do not pull the flexible card wire before releasing the lock.
- The flexible card wire has the conduction side and the insulation side. Check the conduction side and the insulation side before disconnection.

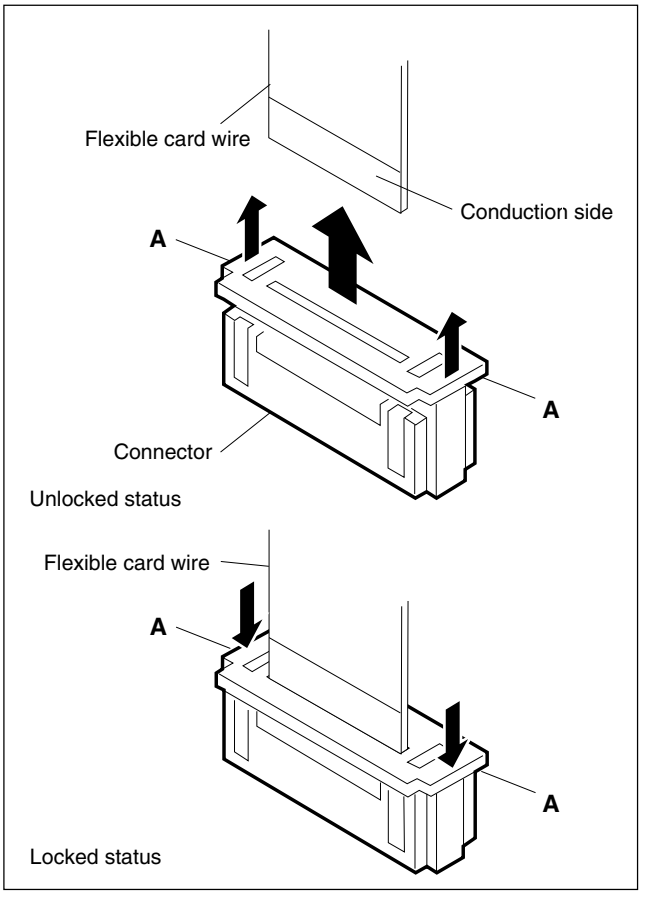
1. Move the portion "**A**" of the connector in the direction of the arrow A to release the lock. Remove the flexible card wire.

Insertion method

Notes

- Confirm that the contacting surface of the flexible card wire is free from stain and dust.
- Confirm that the lock of the connector is already released.

1. Insert the flexible card wire securely to the deep end.
2. Push in the portion marked "**A**" of the connector in the direction of the arrow to lock the connector. Be careful that the flexible card wire is not slanted with respect to the connector.



< Type E >

Removing method

Notes

- Do not pull the flexible card wire before releasing the lock.
- The flexible card wire has the conduction side and the insulation side. Check the conduction side and the insulation side before disconnection.

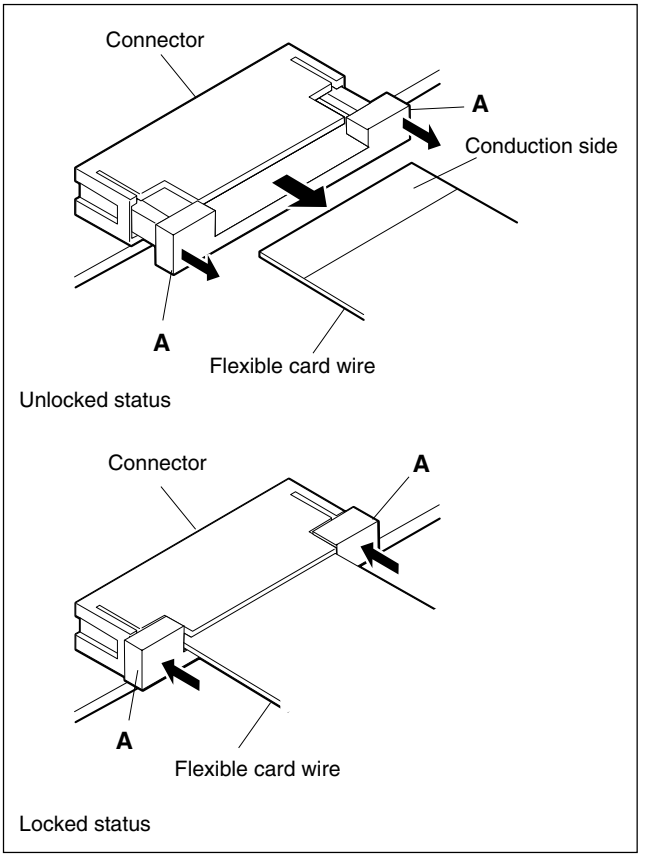
1. Move the portion "**A**" of the connector in the direction of the arrow A to release the lock. Remove the flexible card wire.

Insertion method

Notes

- Confirm that the contacting surface of the flexible card wire is free from stain and dust.
- Confirm that the lock of the connector is already released.

1. Insert the flexible card wire securely to the deep end.
2. Push in the portion marked "**A**" of the connector in the direction of the arrow to lock the connector. Be careful that the flexible card wire is not slanted with respect to the connector.



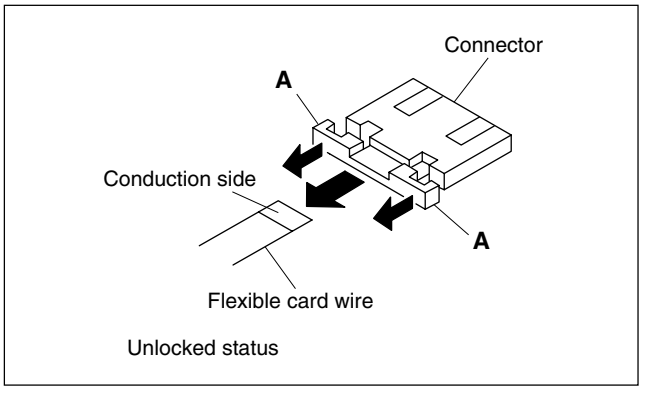
< Type F >

Removing method

Notes

- Do not pull the flexible card wire before releasing the lock.
- The flexible card wire has the conduction side and the insulation side. Check the conduction side and the insulation side before disconnection.

1. Move the portion "**A**" of the connector in the direction of the arrow A to release the lock. Remove the flexible card wire.

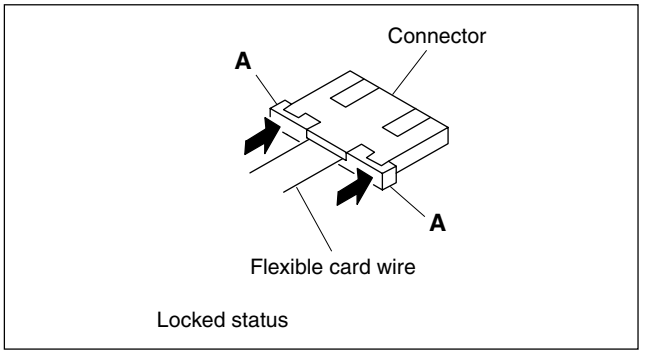


Insertion method

Notes

- Confirm that the contacting surface of the flexible card wire is free from stain and dust.
- Confirm that the lock of the connector is already released.

1. Insert the flexible card wire securely to the deep end.
2. Push in the portion marked "**A**" of the connector in the direction of the arrow to lock the connector. Be careful that the flexible card wire is not slanted with respect to the connector.



2-21. Unleaded Solder

Unleaded solder is used for all the boards of this unit. Boards requiring use of unleaded solder are printed with a lead free mark (LF) indicating the solder contains no lead. (Caution: Some printed circuit boards may not come printed with the lead free mark due to their particular size.)

: LEAD FREE MARK

Notes

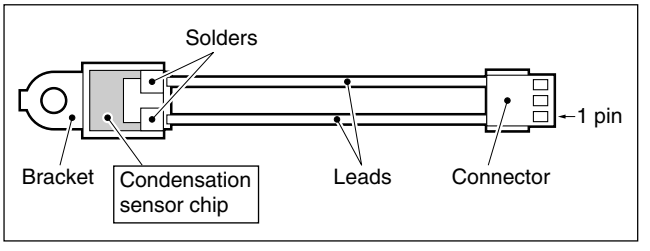
- Be sure to use the unleaded solder for the boards of this unit.
- The unleaded solder melts at a temperature about 40 °C higher than the ordinary solder, therefore, it is recommended to use the soldering iron having a temperature regulator.
- The ordinary soldering iron can be used but the iron tip has to be applied to the solder joint for a slightly longer time. The printed pattern (copper foil) may peel away if the heated tip is applied for too long, so be careful.

2-22. Precautions for use of Condensation Sensor

Due to the foreign substances adhering to the condensation sensor chip (see figure below), the sensor fails to measure the correct value of residence to humidity. This prevents the unit from functioning properly. If any foreign substance gets adhered to the chip, replace the condensation sensor with a new one.

Notes

- Do not touch the chip with bare hands.
- Do not clean the chip with alcohol or other similar agents.



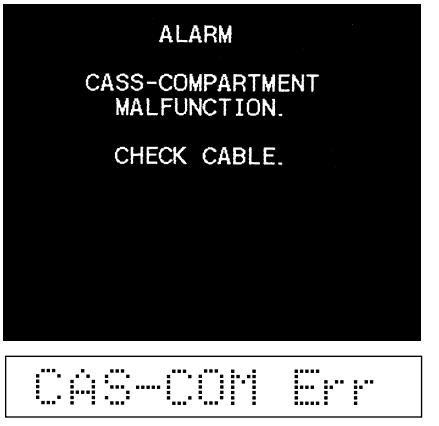
Section 3
Error Messages

3-1. Alarm Display

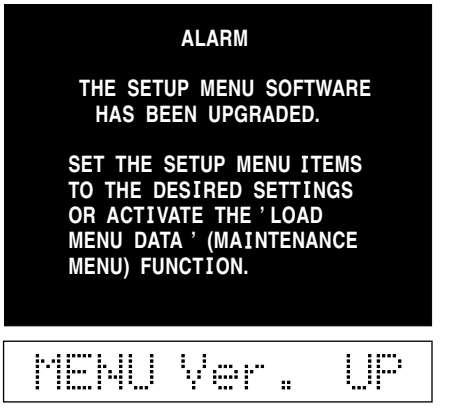
This unit has an alarm display function.
When a problem is detected, an alarm is displayed immediately in the time counter display. The alarm and a message describing the countermeasure are displayed on the monitor area in the LCD and a video monitor connected to the CPST (SUPER) connector.
This unit has two types of alarms : one is for operators while the other is for service persons. This manual describes only the alarms for service persons. For details of alarms for operators, refer to the operating instruction. Activating the alarm display may influence the system, such as when the reference video signal is not used. Therefore, you can select whether or not to display the alarm from the Setup menu selection. As for Setup menu, refer to the operating instruction.
However, the alarms for service persons are displayed regardless of the Setup menu setting.

3-1-1. Alarm Display when the Main Power is Turned On

Detection : The cassette compartment is not attached, or the harness is not connected to the cassette compartment.
Operation after detection : None
Display : The alarm is displayed until any key is pressed.



Detection : Checks the version of the Setup menu.
Operation after detection : The Setup menu operates using the factory settings. The contents of the non-volatile memory (EEPROM) remain unchanged. Therefore, if the setting of the Setup menu is not changed, the same alarm will appear when the main power is turned on.
Display : The alarm is displayed until any key is pressed.


ALARM
THE SETUP MENU SOFTWARE HAS BEEN UPGRADED.
SET THE SETUP MENU ITEMS TO THE DESIRED SETTINGS OR ACTIVATE THE 'LOAD MENU DATA' (MAINTENANCE MENU) FUNCTION.
MENU Ver. UP

Detection : Checks that switch S401-1 to 4 on the SSS-12 board is set to ON.

Operation after detection : None

Display : The alarm is displayed until any key is pressed.

Detection : Checks that the FACTORY USE item of the Setup menu is changed.

Operation after detection : None

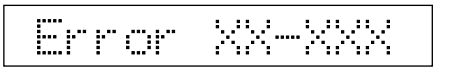
Display : The alarm is displayed until any key is pressed.

3-2. Error Codes

This unit has a self diagnostics function which detects internal abnormalities. When a problem is detected, an error code is displayed immediately in the time counter display, and details of the error appear on the monitor screen.

Note

An error code appears in the column shown by XX-XXX on the display.



When detected, some errors turn the unit to AUTO OFF. (Refer to Section 3-2-3.)
This error is kept in memory even after the main power of this unit is turned off. In other words, the error code or the contents of the detected error appear even when the main power of this unit is turned off and then back on again, so this unit enters AUTO OFF mode again.

This unit enters the emergency EJECT mode when the EJECT key is pressed at this moment.

Note

In the emergency EJECT mode, the tape is ejected gently by usable motor assuming that the tape is slack or a device may be faulty.

The following message appears on the monitor screen when this unit enters the emergency EJECT mode.
The error code is displayed on the time counter display.

The message shown to the right appears on the monitor screen when a cassette tape is ejected in the emergency EJECT mode.
The error code is displayed on the time counter display.

The message shown to the right appears on the monitor screen when a cassette tape cannot be ejected with the emergency EJECT mode.
The error code is displayed on the time counter display.

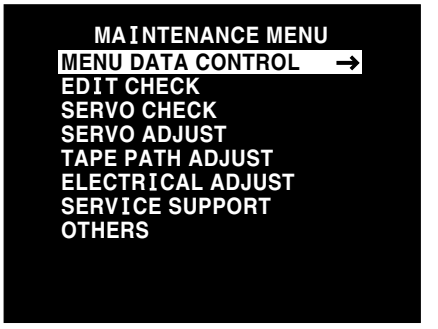
Perform Section “2-4. How to Take Out the Cassette Whose Tape is Slacked (MANUAL EJECT) ” when a cassette tape cannot be ejected with the emergency EJECT mode.

3-2-1. Display of Previously Detected Error Codes

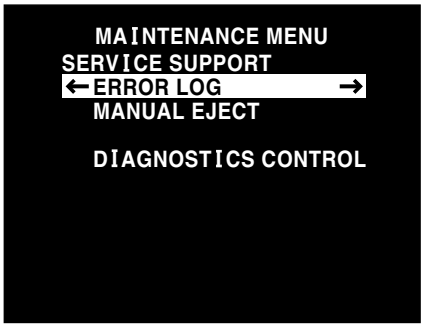
When the HVR-1500 detects an internal abnormality, the error code is memorized in EEPROM. (Excluding error code 9X-XXX)
A maximum of 8 error codes detected previously, starting from the latest error code, can be displayed.

How to display the error code

1. While pressing the ⇦ key, press the MENU key.



2. Move the cursor to SERVICE SUPPORT so that the letters are highlighted using the ⇧, ⇩ keys, then press the ⇨ key.



3. Move the cursor to ERROR LOG so that the letters are highlighted using the ⇧, ⇩ keys, then press the ⇨ key.
   The display changes as shown to the right, and the error log appears.

3-2-2. Main Codes and Sub Codes

Main codes

The main code is a two-digit number that indicates the system which sensed the error.

Main code 0X : Servo and tape path system error
Main code 2X : Mechanism control system error
Main code 3X : Sensor error
Main code 91 : Communication system and interface system error
Main code 92 to 94 : Sync. system error
Main code 95 : Digital signal process system error and communication error with ICs

Sub codes

The sub code is a three-digit number. Each digit has the following meaning.

When the Main Code is 0X or 2X :

X X X
| | |
| | Third digit : Abnormal symptom
| Second digit : Device which senses abnormality
First digit : Mode which senses abnormality.

First digit : Mode which senses abnormality.

0 : Mode cannot be identified, or mode identification is not necessary.
1 : Cassette down mode
2 : Threading mode
3 : STOP mode
4 : F. FWD or REW mode
5 : SEARCH mode
6 : PLAY or RECORD mode
7 : STANDBY-OFF mode
8 : Unthreading mode
9 : Cassette up mode
A : Cassette out mode
(State that a cassette is ejected.)

Second digit : Device which senses abnormality

0 : Device cannot be identified, or device identification is not necessary.
1 : Cassette up/down motor/sensor
2 : Threading motor/FG/sensor
3 : Drum motor/FG
4 : Capstan motor/FG
5 : Supply reel motor/FG
6 : Supply reel brake solenoid
7 : Takeup reel motor/FG
8 : Takeup reel brake solenoid
9 : Supply and takeup reel motor/FG
A : Tension regulator
B : Pinch solenoid
C : Reel position motor/sensor
D : Head cleaning solenoid
E : M stop solenoid

Third digit : Abnormal symptom

0 : Abnormal symptom identification is not necessary.
1 : Operation could not be completed within the specified time.
2 : Abnormal speed detected.
3 : Tape slack detected.
4 : FG cannot be detected.
5 : FG detected.
6 : Rotating direction error detected.
7 : Excessive tension detected.
8 : Abnormal current detected.
9 : The full top or full end of a tape cannot be released.
A : Retry in progress
(Unthreading and re-threading)

When the Main Code is 3X :

All sub codes are 000.

When the Main Code is 91 :

X X X

Third digit : Abnormal symptom

Second digit : CPU (microprocessor) or IC of the communication counterpart.

First digit : CPU (microprocessor) or IC which detects the abnormality.

First and second digits : CPU (microprocessor) code.

0: Villeneuve (HPR-20, IC1203)
1: System control main CPU (SSS-12, IC501)
2: Keyboard (KY-614, KY-616)
3: MEMORY
4: Servo main CPU (SSS-12, IC202)
5: Servo sub CPU (DR-428BG, IC1)
6: MONTA (HPR-20, IC201)
7: SPCON main CPU (SSS-12, IC501)
8: Torino-Flash (HPR-20, IC901, IC902)
9: Rota-cont (RT-10, IC200)
A: Torino (HPR-20, IC701)
B: Estoril (HPR-20, IC501)
C: Dia (HPR-20, IC101)
D: XVIC (DDE-22, IC202)
E: SDI
F: SAVER (DVP-42, IC805), AVANT (DVP-42, IC1001)

Third digit : Abnormal symptom (when the communication counterpart is other than memory)

1 : Abnormal checksum
2 : Abnormality of overrun
3 : Abnormal parity
4 : Abnormal framing
5 : Communication could not be completed in the specified time.
6 : Communication could not be completed in the specified time.

Third digit : Abnormal symptom (when the communication counterpart is memory)

0 : Abnormality of ROM
1 : Abnormality in the external memory area
2 : Abnormality in the internal memory area
3 : Abnormality in the common memory-1 area
4 : Abnormality in the common memory-2 area
5 : Abnormality in the external serial memory-1 area
6 : Abnormality in the external serial memory-2 area
7 : Abnormality in the external serial memory-3 area
8 : Abnormality in the external serial memory-4 area
9 : Abnormality in the EEPROM area
A : Abnormality in the NVRAM area
B : Abnormality in the Hours Meter area
C : Abnormality in the volume adjustment data area
F : Abnormality of MIC

When the Main Code is from 92 to 94 :

X X X

Third digit : Abnormal signal

Second digit : IC to which the signal is input

First digit : CPU (microprocessor) which detects the abnormality

. . . . . Same as the main code 91

Third digit : Abnormal signal

1 : Reference frame pulse of the output signal (NSG OE)
2 : Reference track pulse of the playback side (P-TRKT)
3 : Reference frame pulse of the playback side (P-FLTT)
4 : Reference track pulse of the record side (R-TRKT)
5 : Reference frame pulse of the record side (R-FLTT)
6 : Reference track pulse of the playback side (P-TRKD)
7: Reference frame pulse of the playback side (P-FLTD)
8: Reference track pulse of the record side (R-TRKD)
9: Reference frame pulse of the record side (R-FLTD)

When the Main Code is 95 :

X X X

Second and third digits :
IC of the communication counterpart.
(The second digit indicates the communication line number and the third digit indicates the CS number.)

First digit : CPU (microprocessor) or IC which detects the abnormality.

. . . . . Same as the main code 91

3-2-3. Error Codes

Main code 0X : abnormality of servo and tape path system

① Main code 02

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
058	Detected an abnormal current in the S reel motor.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette tape is inserted.
068	Detected an abnormality of reel brake plunger solenoid.			
078	Detected an abnormal current in the T reel motor.			
0B8	Detected an abnormality of pinch plunger solenoid.	Cassette tape insertion and unthreading are prohibited until the error is solved.		Displayed until the error is solved.
154	Failed to detect the S reel FG by the FG check during cassette tape insertion.	Cassette tape will be ejected.	–	Displayed until the next cassette tape is inserted.
174	Failed to detect the T reel FG by the FG check during cassette tape insertion.			
194	Failed to detect both S and T reel FGs by the FG check during cassette tape insertion.			
254	Failed to detect the S reel FG during threading.	AUTO OFF	EJECT (Emergency EJECT)	
255	Detected the S reel FG during threading.			
274	Failed to detect the T reel FG during threading.			
275	Detected the T reel FG during threading.			
291	Failed to complete winding a tape.			
355	Detected the S reel FG during STOP and STILL.			
375	Detected the T reel FG during STOP and STILL.			
395	Detected both S and T reel FGs during STOP and STILL.			
402	Detected an abnormal tape speed during F. FWD and REW.	STOP	The machine operates normally after the error is solved.	
403	Detected slack tape during F. FWD and REW.	AUTO OFF	EJECT (Emergency EJECT)	
454	Failed to detect the S reel FG during F. FWD and REW.			
474	Failed to detect the T reel FG during F. FWD and REW.			
494	Failed to detect both S and T reel FGs during F. FWD and REW.			
496	Detected the abnormal direction of S and T reel rotation during F. FWD and REW.			
503	Detected slack tape during search.			
554	Failed to detect the S reel FG during search.			
574	Failed to detect the T reel FG during search.			
594	Failed to detect the S and T reel FGs during search.			
596	Detected the abnormal direction of S and T reel rotation during search.			
603	Detected slack tape during PLAY and REC.			

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
654	Failed to detect the S reel FG during PLAY and REC.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette tape is inserted.
674	Failed to detect the T reel FG during PLAY and REC.			
694	Failed to detect both S and T reel FGs during PLAY and REC.			
696	Detected the abnormal direction of S and T reel rotation during PLAY and REC.			
803	Detected slack tape during unthreading.			
854	Failed to detect the S reel FG during unthreading.			
855	Detected the S reel FG during unthreading.			
874	Failed to detect the T reel FG during unthreading.			
875	Detected the T reel FG during unthreading.			
A55	Detected the S reel FG during cassette eject.	Insertion of a cassette is inhibited until the error is solved.		
A75	Detected the T reel FG during cassette eject.			
A95	Detected both S and T reel FGs during cassette eject.			

② Main code 06

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
3A7	Detected abnomal tape tension during STOP.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette tape is inserted.
4A7	Detected abnomal tape tension during F.FWD/REW.			
5A7	Detected abnomal tape tension during SEARCH.			
6A7	Detected the abnormal tape tension during PLAY and RECORD.	The mode at the time of detection is kept continued. (If the mode is PLAY, PLAY continues.) If mode is changed to other than PLAY and RECORD, machine enters AUTO OFF.	The machine operates normally after the error is solved. The PLAY and RECORD modes continue but other modes are changed to STOP then EJECT (Emergency EJECT).	Displayed until the error is solved and any key is pressed.

③ Main code 07

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
042	Detected the abnormal capstan speed.	STOP	The machine operates normally after the error is solved.	Displayed until any key is pressed.
144	Failed to detect the capstan FG by the FG check during cassette tape insertion.	Cassette tape will be ejected.	–	Displayed until the next cassette is inserted.

④ Main code 08

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
03A	Detected the abnormal drum speed. **Monitor screen** 	Retry (The mechanism unthreads once then threads again.)	EJECT	Displayed until the error is solved.
032	The abnormal drum speed error is not solved.	AUTO OFF	EJECT	Displayed until the next cassette is inserted.

⑤ Main code 09

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
010	Detected abnomal position of cassette compartment.	Cassette tape insertion and unthreading are prohibited until the error is solved.		Displayed until the error is solved.
020	Detected an abnormality of threading position sensor.			
028	Detected an abnormal current of threading motor.			
221	Failed to complete threading within the specified time	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette is inserted.
224	Failed to detect the threading FG during threading.			
821	Failed to complete unthreading within the specified time			
824	Failed to detect the threading FG during unthreading.			

• Main code 2X : Abnormality related to the mechanism control

① Main code 20

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
018	Detected the abnormal current in the cassette up/down motor.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette is inserted.
111	Failed to complete the cassette down motion within the specified time.			
911	Failed to complete the cassette up motion within the specified time.			

② Main code 21

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
0C8	Detected the abnormal current in the reel position motor.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette is inserted.
OE8	Detected the abnormal current of M stop plunger solenoid.			
1C1	Failed to complete the reel position movement within the specified time.	Cassette tape will be ejected.		

③ Main code 22

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
0D8	Detected an abnormal current of cleaning plunger solenoid.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette is inserted.

• Main code 3X : Sensor trouble

Sub codes are all 000.

Error code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
31-000	Failed to release the tape top.	STOP	PLAY, FF, EJECT	Displayed until the error is solved and any key is pressed.
32-000	Failed to release the tape end.	STOP	PLAY, REW, EJECT	
33-000	Detected an abnormal current of reel shift sensor LED.	Insertion of cassette tape is inhibited.	–	
34-000	Detected an abnormality of threading sensor.	Cassette tape insertion and unthreading are prohibited until the error is solved.		
35-000	Detected an abnormality of cassette compartment position sensor.	EJECT	–	
36-000	Detected an abnormality of fan motor.	Only error is displayed.	–	
39-000	Detected an abnormality of cassette top/end sensor LED.	STOP	PLAY, EJECT	
3A-000	Detected an abnormality of tension sensor.	AUTO OFF	EJECT (Emergency EJECT)	

Main code 91 : Abnormality of communication system or interface system

Main code	Sub code	Detected contents
91	125	Communication error between system control and keyboard (detected by SY).
	130	System control detected abnormality of ROM.
	131	System control detected abnormality of external memory.
	132	System control detected abnormality of internal memory.
	133	System control detected abnormality of common memory for SERVO.
	134	System control detected abnormality of common memory for SPCON.
	139	System control detected abnormality of EEPROM (IC8 on the DR-428BG board).
	13A	Detected abnormality in NVRAM.
	13B	Detected abnormality in Resetable Hour Meter.
	13C	Detected abnormality in Volume adjustment data area.
	13F	Communication error to MIC.
	145	Communication error between system control and servo.
	165	Communication error between system control and MONTA.
	175	Communication error between system control and SPCON.
	195	Communication error between system control and the SW microprocessor.
	1A5	Communication error between system control and external keyboard.
	1D5	Communication error between system control and the DV microprocessor.
	1E5	Communication error between system control and the SDI-94 board.
	1F5	Communication error between system control and AVANT.
	215	Communication error between system control and keyboard (detected by KY).
	225	LCD driver writing error
	239	EEPROM (KY-616 board, IC300) access error
	430	Servo main detect abnormality of ROM.
	431	Servo detected abnormality of external memory.
	439	Detected abnormality in the servo adjustment data area.
	43B	Detected abnormality in Unresetable Hours Meter.
	455	Communication error between servo main and servo sub microprocessors.
	463	Communication error between servo main and MONTA.
	539	Detected abnormality in the EQ data area.
	603	Communication error between MONTA and Villenuve.
	605	Villenuve initialization error
	613	Communication error between MONTA and system control.
	643	Communication error between MONTA and servo main.
	680	Access error of MONTA to Torino-Flash.
	689	Torino-Flash initialization error
	693	Communication error between MONTA and Rota-cont.
	695	Rota-cont initialization error
	6A5	Torino initialization error
	6B5	Estoril initialization error
	6C5	Dia initialization error
	6F5	SAVER initialization error
	730	SPCON detected abnormality of ROM.
	731	SPCON detected abnormality of external RAM (IC503 on the SSS-12 board).
	732	SPCON detected abnormality of internal RAM.
	733	SPCON detected abnormality of the communication IC (IC503 on the SSS-12 board) with SY.
	734	SPCON detected communication error (IC401 on the SSS-12 board) with SV.

Main code 92 to 94 : Abnormality of sync system

Main code	Sub code	Detected contents
92	101	System control detected abnormality in NSG OE.
	702	SPCON detected abnormality in P-TRKT.
	703	SPCON detected abnormality in P-FLTT.
	704	SPCON detected abnormality in R-TRKT.
	705	SPCON detected abnormality in R-FLTT.
93	407	The servo main microprocessor detected abnormality of P-FLTD.
	506	The servo sub microprocessor detected abnormality of P-TRKD.
94	409	The servo main microprocessor detected abnormality of R-FLTD.
	508	The servo sub microprocessor detected abnormality of R-TRKD.

Main code 95 : Communication error with digital process system IC

Main code	Sub code	Detected contents
95	120	Communication error between system control and C1R MOD.
	122	Communication error between system control and C1P MOD.
	12A	Communication error between system control and NSG.
	12C	Communication error between system control and VPRAD.
	190	Communication error between system control and FINE.
	1C0	Communication error between system control and XVIC.
	415	Communication error between servo and DIAS-R.
	416	Communication error between servo and HIF.
	423	Communication error between servo and DIAS-P.
	511	Communication error between drum and M1.
	693	Communication error between MONTA and Rota-cont.
	710	Frame communication error between SPCON and DIAS-P.
	711	Track pair communication error between SPCON and DIAS-P.
	712	Communication error between SPCON and V2P.
	713	Communication error between SPCON and F1P.
	714	Communication error between SPCON and SIFE.
	715	Communication error between SPCON and SIFP.
	720	Communication error between SPCON and AIFP.
	730	Frame communication error between SPCON and DIAS-R.
	731	Track pair communication error between SPCON and DIAS-R.
	732	Communication error between SPCON and V2R.
	733	Communication error between SPCON and F1R.
	734	Communication error between SPCON and SIFR.
	740	Frame communication error between SPCON and A1R Front.
	741	Track pair communication error between SPCON and A1R Front.
	742	Frame communication error between SPCON and A1R Rear.
	743	Track pair communication error between SPCON and A1R Rear.
	744	Communication error between SPCON and AIF-INDI.
	745	Communication error between SPCON and ACTL.
	751	Communication error between SPCON and REC-DSP.
	752	Communication error between SPCON and PB-DSP.
	753	Communication error between SPCON and OUT-DSP.

3-2-4. Possible Causes of Errors

Possible causes of errors

Main code	02												06
Sub code / Possible causes	403 503 603	574 674 803	554 654	402 454 474	355 375	058 078	154 174 194 255 275 875 A55 A75 A95	254 854	594 694	494	395	496 596 696	3A7 4A7 5A7 6A7
1. Tape is stuck to the tape running mechanism.	O	O	O	O				O		O			O
2. Tape is loosely wound in the cassette.	O	O	O	O	O						O	O	
3. Cassette tape is not confined properly. (Cassette compartment is unlocked.)	O	O	O	O				O	O	O	O	O	
4. Reel motor does not generate the correct torque.	O	O	O	O	O	O	O	O	O	O	O	O	O
5. Abnormality of reel FG	O	O	O	O	O		O	O	O	O	O	O	O
6. Tension regulator is defective.	O												
7. Cut-and-spliced tape is used.		O	O		O				O		O	O	
8. Top detector and end detector are defective.			O	O					O	O			O
9. Pinch roller has insufficient pressure against capstan.									O			O	

Check procedure for the possible causes, and the related circuit boards and devices

Possible causes	Check items and check procedure	Related circuit boards and devices
1. Tape is stuck to the tape running mechanism. • Tape is dirty. • Tape run mechanism is dirty. • Humidity or condensation	• Check if tape is stuck to tape guides or drum. • Check if foreign material is adhered to tape. • Check if tape is damaged. • Check if foreign material is adhered to tape run mechanism and drum.	
2. Tape is loosely wound in the cassette. • A tape which has been used for many times, is used. • A damaged tape is used.	• Check if tape has severe non-uniform winding.	
3. Cassette tape is not confined properly. (Cassette compartment is unlocked.)	Check that the four pins of the cassette compartment are inserted into the holes of the slant table. Check that the cassette compartment retainer is securely fastened. ↓ If a cassette compartment is unlocked when a cassette compartment is inserted, exchange the cassette compartment. ↓ When a cassette compartment is lock after it is exchanged, the trouble is caused by the cassette compartment. Otherwise the trouble is caused by the defective drive circuit.	cassette compartment DR-428BG board

Possible causes	Check items and check procedure	Related circuit boards and devices
4. Reel motor does not generate the correct torque. • Reel brake has mechanical defect. • Reel brake solenoid is open. • Reel brake solenoid drive IC is defective. • Reel motor is defective. • Reel motor drive circuit is defective. • Harness is defective.	• When the S and T reel brakes are considered to be the cause of trouble : Check the S and T reel brakes. Check that the S and T reel brakes are released. • When the S and T reel motors are considered to be the cause of trouble : Perform the servo adjustment. Confirm that the servo adjustment is completed as intended.	When the reel brake is considered to be the cause of trouble : DR-428BG board, reel brake solenoid When the S and T reel motor or the S and T reel FG is considered to be the cause of trouble : DR-428BG board, S and Treel motor
5. Abnormality of reel FG • S and T reel motor is defective. • S and T reel FG amp is defective.	Perform the S and T reel adjustment. Confirm that the reel FG adjustment is completed as intended.	
6. Tension regulator is defective.	Check the magnet position using the tension adjustment menu. Confirm that OK appears on display.	SSS-12 board, DR-428BG board, SE-538G board
7. Cut-and-spliced tape is used.		
8. Top detector and end detector are defective.	Check the tape top and tape end. The top and end sensor must turn on and off correctly.	When the tape top sensor is considered to be the cause of trouble : SE-522G board, DR-428BG board, tape top sensor LED When the tape end sensor is considered to be the cause of trouble : SE-521G board, DR-428BG board, tape end sensor LED
9. Pinch roller has insufficient pressure against capstan. • Pinch roller has mechanical defect. • Pinch solenoid is open. • Pinch solenoid drive IC is defective.	Check the pinch roller. Pinch roller must be pressed against the capstan shaft correctly.	DR-428BG board, pinch solenoid

Section 4
Maintenance Menu

4-1. Menu Structure

This unit has a maintenance menu which is used for maintenance.
The maintenance menu has a layered structure through which you move to perform the various checks, settings and adjustments using the specified menu items. Contents of the maintenance menu are displayed on the monitor area in the LCD and the video monitor connected to the CPST (SUPER) connector and the time counter display.

Values in parenthesis ( ) are time counter display.

MENU, First layer	MENU, Second layer	MENU, Third layer
MENU DATA CONTROL (MENU CNT)	MENU STATUS DISPLAY (>MENU STA) SAVE MENU DATA (>Save MENU) LOAD MENU DATA (>Load MENU)	
EDIT CHECK (EDIT Check)	VIDEO INSERT (>VIDEO INS) A1 INSERT (>A1 INS) A2 INSERT (>A2 INS) TC INSERT (>TC INS) ASSEMBLE (>ASSEMBLE)	
SERVO CHECK (SV Check)	SENSOR CHECK (>Sensor)	CASS-COMPARTMENT (>>Cass-COM) TAPE TOP/END (>>Top/End) HUMID [MOISTURE] (>>HUMID) REC INHIBIT (>>REC INHI.)
	MOTOR CHECK (>Motor)	S-REEL (>>S-Reel) T-REEL (>>T-Reel) THREADING (>>Threading) CASS-COMPARTMENT (>>Cass-COM) CAPSTAN (>> Capstan) DRUM (>>Drum) REEL POSITION (>>Reel POS.)
	PLUNGER CHECK (>Plunger)	PINCH (>>Pinch) REEL BRAKE (>>Brake) M PLUNGER (>>M Plunger) HEAD CLEANER (>>H.Cleaner)
SERVO ADJUST (SV Adjust)	S/T-REEL & CAPSTAN (>Reel&Cap.) S-REEL ONLY (>S-Reel) T-REEL ONLY (>T-Reel) CAPSTAN ONLY (>Capstan) TENSION (>Tension)	
TAPE PATH ADJUST (TP Adjust)	TRACKING ADJUST (>Tracking)	
	RF SWITCHING POSITION (>Switching)	

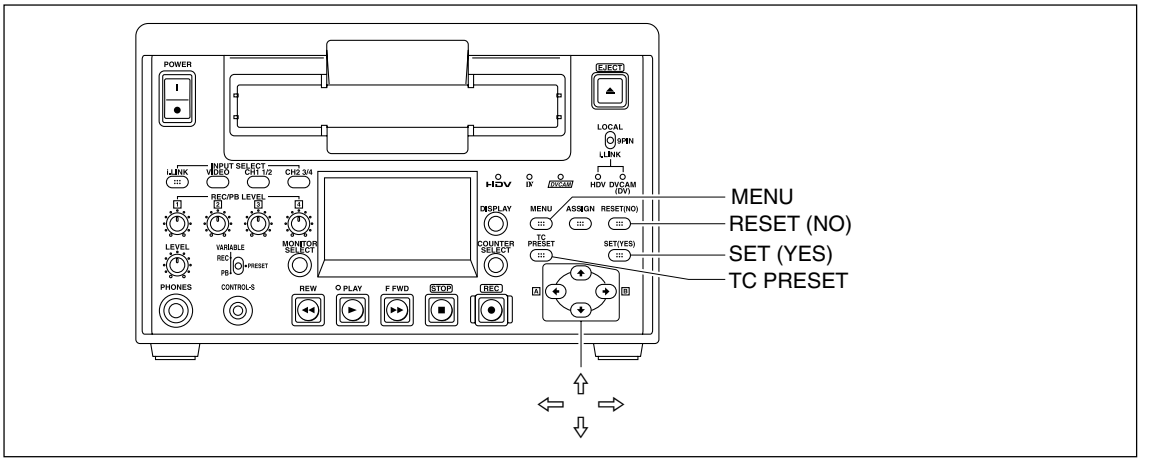
Values in parenthesis ( ) are time counter display.

MENU, First layer	MENU, Second layer	MENU, Third layer
ELECTRICAL ADJUST (EL Adjust)	PLL F0 (>PLL f0)	
	EQ AUTO ADJ (>EQ auto)	DVCAM (>>DVCAM) DV (>>DV) DVCPRO (>>DVCPRO)
	EQ MANUAL ADJ (>EQ manual)	DVCAM (>>DVCAM) DV (>>DV) DVCPRO (>>DVCPRO)
	REC CURRENT (>REC cur) FE CHECK (>FE check)	
	PROCESS CHECK : OFF (>Proc check)	OFF (>>off) DPR (>>dpr) MAIN (>>main) SUB (>>sub) PRE (>>pre)
	REF CHECK : OFF (>REF check)	OFF (>>off) NON-STD (>>Non-STD) STD (>>STD)
	RP DATA INITIALIZE (>RP initial)	
	AVP BOARD ADJ (>AVP Adjust)	CLK 27MHz INT ADJ (>>27MHz Adj) CLK 74/2MHz INT ADJ (>>74MHz Adj) CF DET CENTERING (>>CF Adj) SYNC PHASE ADJ (>>SYNC Adj) CHARACTER DC ADJ (>>CHARA Adj)
	LCD ADJ (>LCD Adjust)	CONTRAST ADJ (>>Contrast) V-COM ADJ (>>V-COM) SMPL HOLD PHASE ADJ (>>SMPL hold) WHITE BAL COARSE ADJ (>>WB coarse) WHITE BAL FINE ADJ (>>WB fine)
SERVICE SUPPORT (Support)	ERROR LOG (>Error LOG) MANUAL EJECT (>Manu.Eject)	
	DIAGNOSTICS CONTROL (>DIAG CNT)	CLEAR ERROR LOG (>>Clear LOG)
OTHERS (Others)	SOFTWARE VERSION (>Version) SERIAL NO. (>Serial No.) KEYBOARD CHECK (>KY Check)	
	MEMORY DISPLAY (>MEM Check)	SY MEMORY DISPLAY (>> SY MEM.) SV MEMORY DISPLAY (>> SV MEM.) SP MEMORY DISPLAY (>> SP MEM.) KY MEMORY DISPLAY (>> KY MEM.) MO MEMORY DIAPLAY (>> MO MEM.) CM DISPLAY (>> CM DISP.)
	DATA DISPLAY (>Data Check)	SP DATA DISPLAY (>>SP DATA)

4-2. How to Operate Maintenance Menu

4-2-1. Location and Function of Switches

Use ⇧, ⇩, ⇦, ⇨, [MENU], [SET (YES)], [TC RESET], [RESET (NO)] switches on the front panel shown below to perform the maintenance menu.



The maintenance menu has a layered structure through which you move to select the desired item.

⇧ KEY : Use this key to move in the direction of ↑ within the same layer.

⇩ KEY : Use this key to move in the direction of ↓ within the same layer.

⇦ KEY : Use this key to move in the direction of ← to higher layers.

⇨ KEY : Use this key to move in the direction of → to lower layers. (It is inoperative if there is no lower layer.)

To indicate depth of layer, the displayed menu items are indented on the monitor screen and ">" is added to the top on the time counter display.

4-2-2. How to Enter the Maintenance Menu

1. While pressing the ⇦ key, press the [MENU] key. The HVR-1500 enters the maintenance menu. The maintenance menu appears on the LCD and video monitor.
2. Select the desired item using the ⇧ key and the ⇩ key. The cursor shown with a white background moves to the selected item.
3. After the desired item is selected, press the ⇨ key to designate the selected item.

4-2-3. How to Exit the Maintenance Menu

Press the [MENU] key to exit the maintenance menu.

4-3. Contents of Maintenance Menu

4-3-1. MENU DATA CONTROL

The MENU DATA CONTROL item provides a SETUP MENU data display and saving and loading the SETUP MENU data.
This item is used to return the settings to their original values after maintenance is complete or ROM upgrading is complete.

Operating procedure

1. Enter the maintenance menu.
2. Move the cursor to “MENU DATA CONTROL” which is displayed with a white background, using the ⇧, ⇩ keys.

3. Press the ⇨ key.
   “MENU DATA CONTROL” is selected and its lower layer submenu appears.

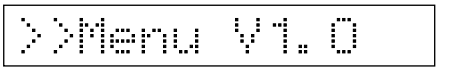
4. Move the cursor displayed with a white background to a desired item using the ⇧, ⇩ keys.
5. When an item is selected, press the ⇨ key. The contents of the selected item appear.
6. Press the ⇦ key to exit MENU DATA CONTROL and return to the main menu.
7. Press the MENU key to exit the maintenance menu.

(1) MENU STATUS DISPLAY

Displays the current status of the SETUP MENU data.

MENU VERSION :	Version number of the SETUP MENU
NUMBER OF ITEM :	Numbers of the SETUP MENU items
CHANGED ITEM :	Numbers of the items which were changed from the factory default settings
DATA CHECK SUM :	Data check sum

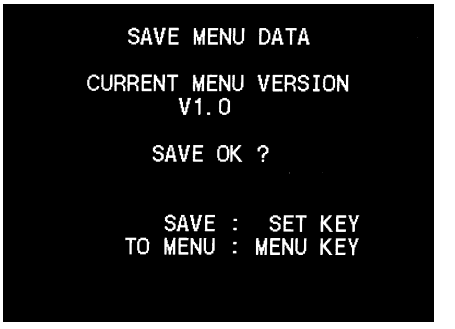
Pressing ⇦, ⇨ keys displays the status of the SETUP MENU stored in the menu bank 1 to 4.



(2) SAVE MENU DATA

This is used to temporarily save the user's SETUP MENU data. A temporary saved data can be reset later.

1. The version of the current setup menu is displayed, and it is waiting to press the SET (YES) key.
   * Pressing the MENU key returns to the main menu.



2. Press the SET (YES) key.
   The SETUP MENU data is stored in EEPROM.
   Confirm that [COMPLETE] appears and data saving is complete.

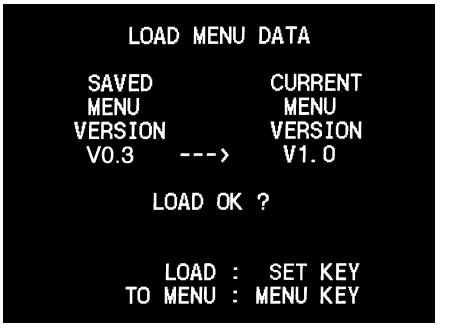
Notes

- Data which has once been saved will not be deleted by turning the main power on and off, or by upgrading the ROM version. However, the saved data is deleted when the DR-428BG board or the EEPROM is replaced because the data is saved in the EEPROM in the DR-428BG board.
- When the SETUP MENU is upgraded by ROM's version upgrade, an alarm message appears after the ROM is replaced. Either initialize the SETUP MENU or execute "LOAD MENU DATA" when the alarm appears.

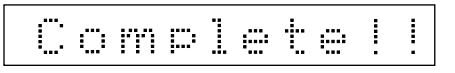
(3) LOAD MENU DATA

The saved data is stored as ordinary SETUP MENU data when it is loaded.

1. The version number of the current SETUP MENU and that of the SETUP MENU to be loaded are displayed, and it is waiting to press the SET (YES) key.
   * Pressing the MENU key returns to the main menu.



2. Press the SET (YES) key.
   The SETUP MENU data is stored in EEPROM.
   Confirm that [COMPLETE] appears and data saving is complete.



In the case of trouble :

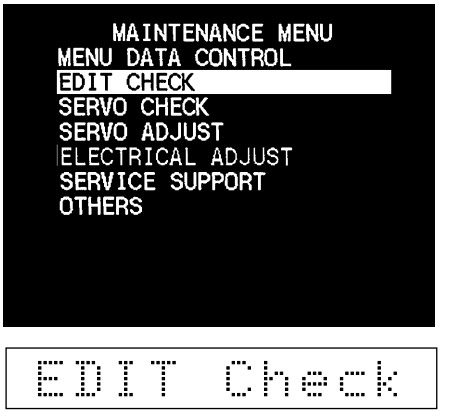
Loading of the data will not start if SETUP MENU data has not been saved or the saved SETUP MENU data contains an error.

4-3-2. EDIT CHECK

Enables the editing function to be checked without using a remote controller.

Operating procedure

1. Enter the maintenance menu.
2. Move the cursor to “EDIT CHECK” which is displayed with a white background using the ⇧, ⇩ keys.



3. Press the ⇨ key.
   “EDIT CHECK” is selected and its lower layer submenu appears.

4. Move the cursor displayed with a white background to a desired item using the ⇧, ⇩ keys.
5. When an item is selected, press the ⇨ key. The contents of the selected item appear.
6. Press the ⇦ key to exit EDIT CHECK and return to the main menu.
7. Press the MENU key to exit the maintenance menu.

1. VIDEO INSERT

Pressing the REC and PLAY keys simultaneously enters the VIDEO INSERT mode.

2. A1 INSERT

Pressing the REC and PLAY keys simultaneously enters the AUDIO CH-1 INSERT mode.

3. A2 INSERT

Pressing the REC and PLAY keys simultaneously enters the AUDIO CH-2 INSERT mode.

4. TC INSERT

Pressing the REC and PLAY keys simultaneously enters the TIME CODE INSERT mode.

5. ASSEMBLE

Pressing the REC and PLAY keys simultaneously enters the ASSEMBLE mode.

Note

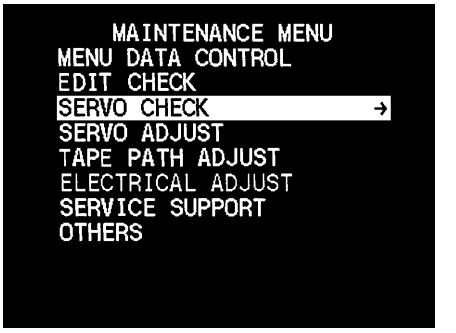
When the REC MODE of the AUDIO CONTROL is set to 4 channel, A1 is assigned to CH-1 and CH-2, and A2 is assigned to CH-3 and CH-4.

4-3-3. SERVO CHECK

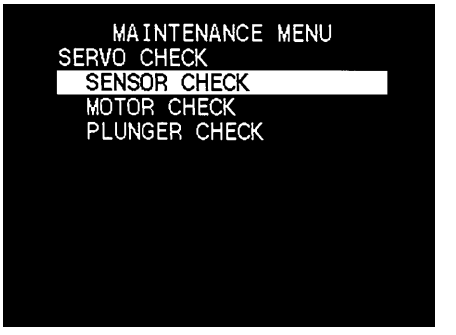
Checks the servo system automatically or semi-automatically.

Operating procedure

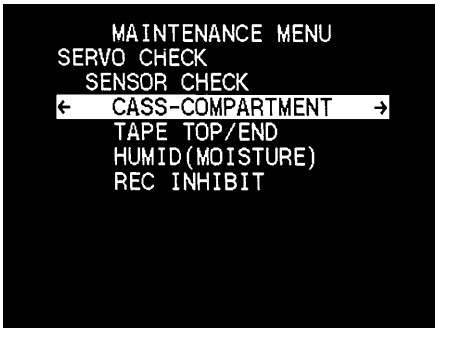
1. Enter the maintenance menu.
2. Move the cursor to “SERVO CHECK” which is displayed with a white background using the ⇧, ⇩ keys.

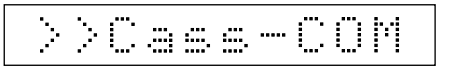


3. Press the ⇨ key.
   “SERVO CHECK” is selected and its lower layer submenu appears.
4. Move the cursor displayed with a white background to a desired item using the ⇧, ⇩ keys.



5. Press the ⇨ key.
   The lower layer submenu appears.
6. Move the cursor displayed with a white background to a desired item using the ⇧, ⇩ keys.
7. Press the ⇨ key to select the desired item.
8. Press the SET (YES) key to execute the selected item.
9. After completing the check, press the MENU key to return to the main menu.
10. To check other menus and submenus, repeat steps 4 to 9.
11. Press the MENU key to exit the maintenance menu.





Note

If the MENU key is pressed while the check is in progress, the check operation is forcibly ended and the display returns to the main menu.

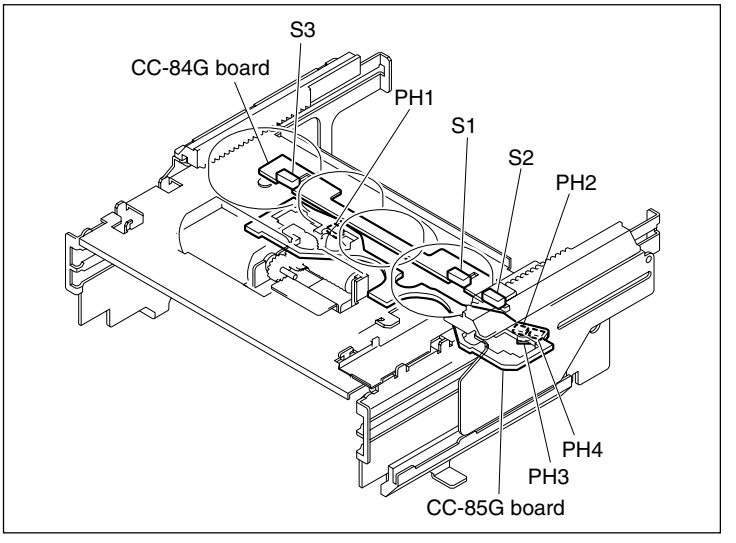
1. SENSOR CHECK

The respective items of “SENSOR CHECK” are described below :

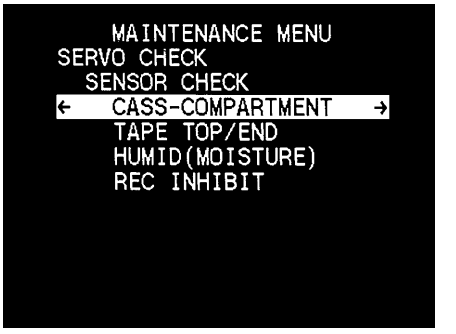
① CASS-COMPARTMENT

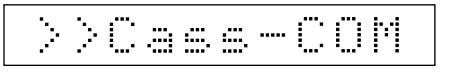
Checks the respective switches of the cassette compartment.

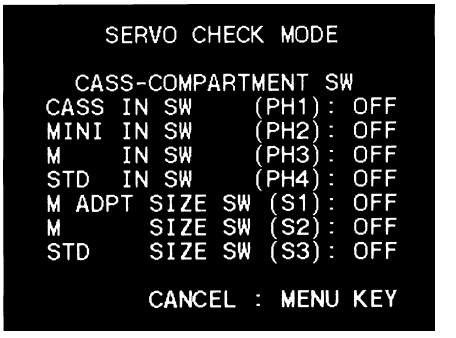
SW/Sensor	Applicable board
PH1 PH2 PH3 PH4	CC-85G
S1 S2 S3	CC-84G



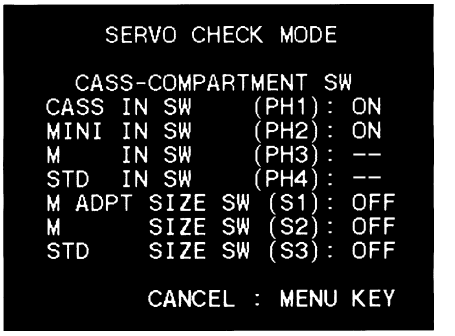
1. Execute the CASS-COMPARTMENT.
2. Confirm that the sensors are all OFF with no cassette inserted.



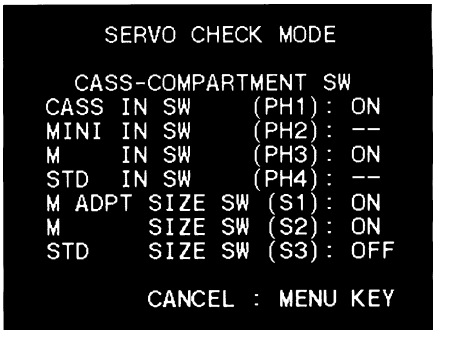



SERVO CHECK MODE
CASS-COMPARTMENT SW
CASS IN SW (PH1): OFF
MINI IN SW (PH2): OFF
M IN SW (PH3): OFF
STD IN SW (PH4): OFF
M ADPT SIZE SW (S1): OFF
M SIZE SW (S2): OFF
STD SIZE SW (S3): OFF
CANCEL : MENU KEY

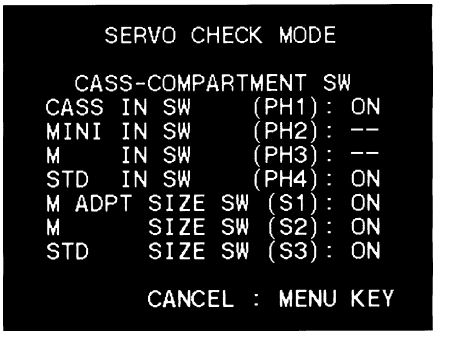
3. Insert the mini-cassette and confirm that the status of the sensor is the monitor display shown right.


SERVO CHECK MODE
CASS-COMPARTMENT SW
CASS IN SW (PH1): ON
MINI IN SW (PH2): ON
M IN SW (PH3): --
STD IN SW (PH4): --
M ADPT SIZE SW (S1): OFF
M SIZE SW (S2): OFF
STD SIZE SW (S3): OFF
CANCEL : MENU KEY

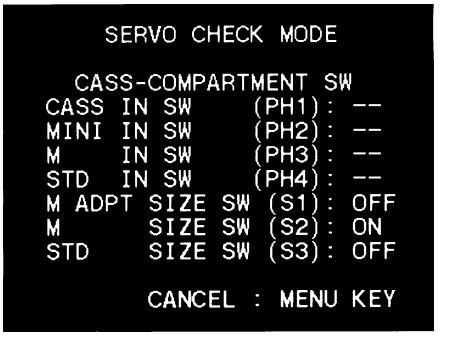
4. Insert the M-cassette and confirm that the status of the sensor is the monitor display shown right.


SERVO CHECK MODE
CASS-COMPARTMENT SW
CASS IN SW (PH1): ON
MINI IN SW (PH2): --
M IN SW (PH3): ON
STD IN SW (PH4): --
M ADPT SIZE SW (S1): ON
M SIZE SW (S2): ON
STD SIZE SW (S3): OFF
CANCEL : MENU KEY

5. Insert the standard cassette and confirm that the status of the sensor is the monitor display shown right.


SERVO CHECK MODE
CASS-COMPARTMENT SW
CASS IN SW (PH1): ON
MINI IN SW (PH2): --
M IN SW (PH3): --
STD IN SW (PH4): ON
M ADPT SIZE SW (S1): ON
M SIZE SW (S2): ON
STD SIZE SW (S3): ON
CANCEL : MENU KEY

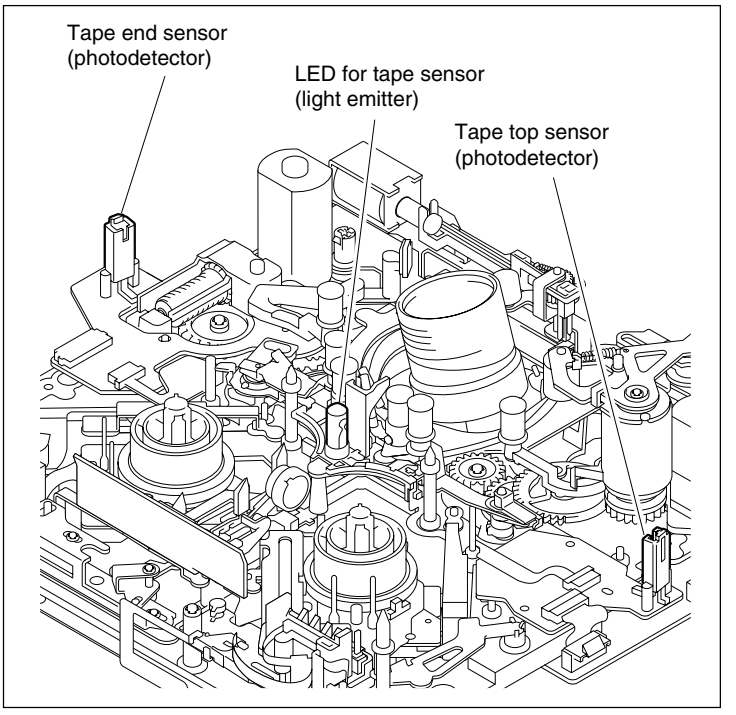
6. Insert the M-ADPT (Cassette adaptor for DVCPRO) and confirm that the status of the sensor is the monitor display shown right.

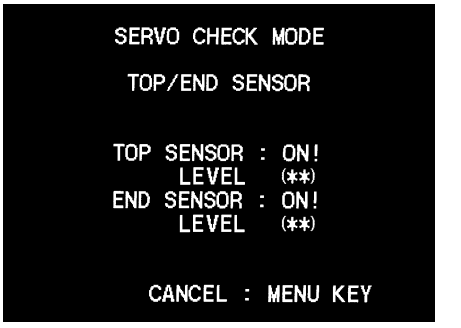

SERVO CHECK MODE
CASS-COMPARTMENT SW
CASS IN SW (PH1): --
MINI IN SW (PH2): --
M IN SW (PH3): --
STD IN SW (PH4): --
M ADPT SIZE SW (S1): OFF
M SIZE SW (S2): ON
STD SIZE SW (S3): OFF
CANCEL : MENU KEY

∗ − − : not care

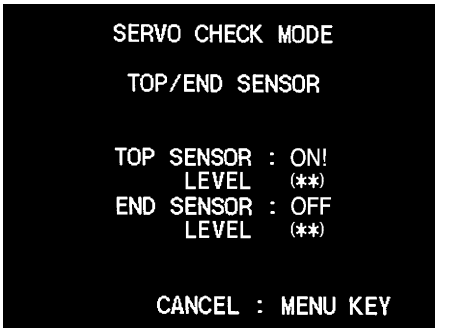
② TAPE TOP/END

Checks the tape-top and tape-end sensors.

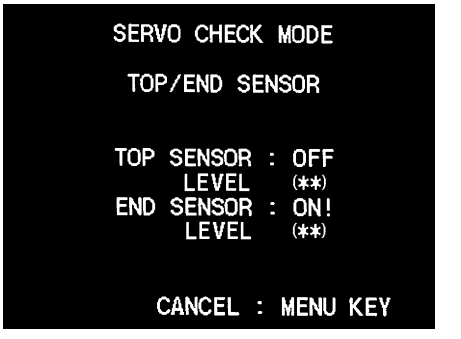




1. Execute the TAPE TOP/END.
2. Confirm that both TOP SENSOR and END SENSOR are [ON!].
3. Interrupt between the LED for the tape sensor (light emitter) and the tape-top sensor (photodetector) by inserting a finger or the like.
   Confirm that the TOP SENSOR display changes from [ON!] to [OFF] on the monitor display.



4. Interrupt between the LED for the tape sensor (light emitter) and the tape-end sensor (photodetector) by inserting a finger or the like.
   Confirm that the END SENSOR display changes from [ON!] to [OFF] on the monitor display.

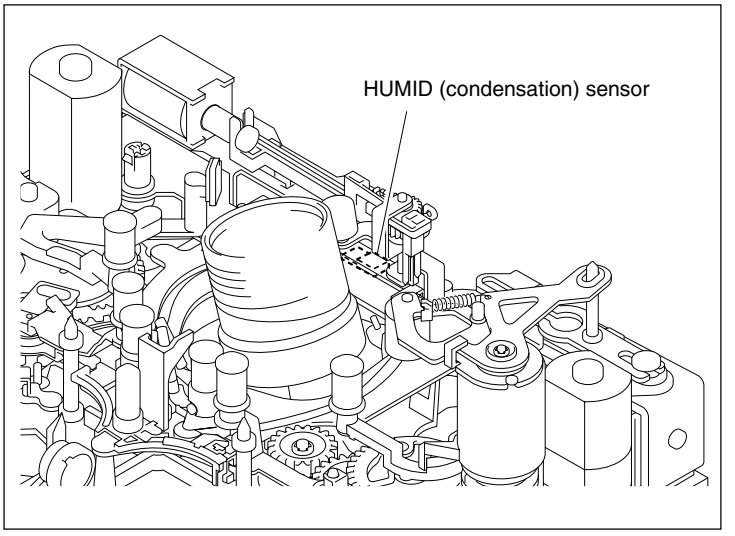


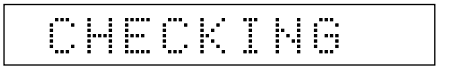
In the case of trouble :

If the display does not change check whether the tape-top sensor or the tape-end sensor itself is defective.
Check also the tape-top/tape-end sensor circuit (DR-428BG, SE-521G/522G board).

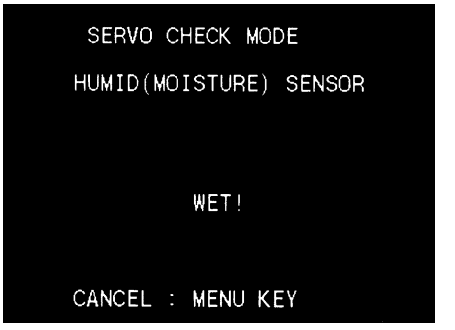
③ HUMID (MOISTURE)

Checks the HUMID (condensation) sensor.





1. Execute the HUMID (MOISTURE).
2. Bring a cotton swab moistened with water in contact with the HUMID sensor.
   Confirm that [DRY] changes to [WET!] on the monitor display.



3. Blow wind onto the HUMID sensor to evaporate any water.
   Confirm that the display changes to [DRY] on the monitor 30 minutes later.

   Note

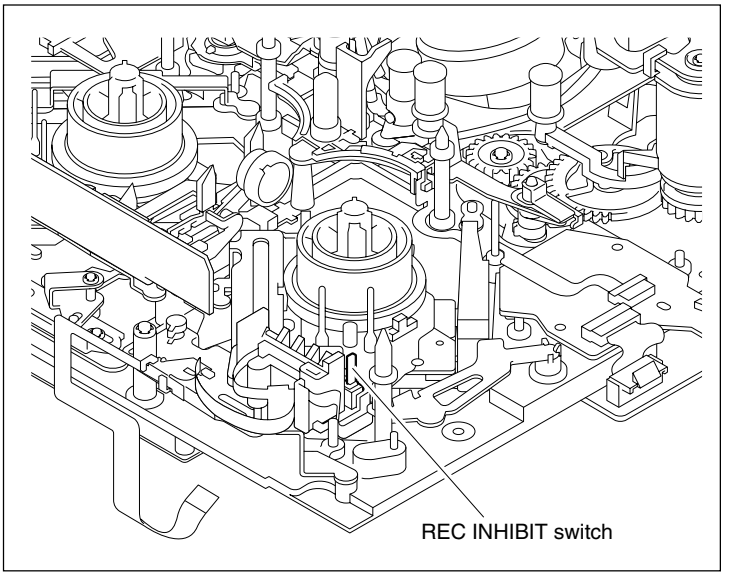
   Once the HUMID sensor detects [WET!], even if make it dry immediately, it takes 30 minutes to detect [DRY].

In the case of trouble :

If the display does not change from DRY to WET!, check whether the HUMID sensor itself is defective.
Check also the HUMID sensor detection circuit (DR-428BG board).

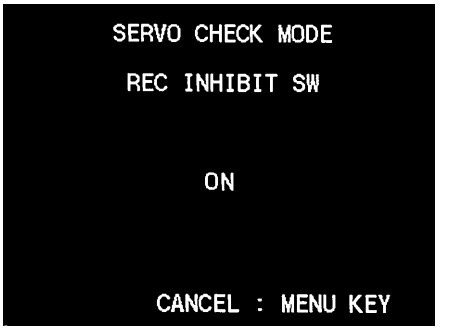
④ REC INHIBIT

Checks the REC INHIBIT switch.



1. Execute the REC INHIBIT.
2. Confirm the monitor display is as shown right.

3. Press the REC INHIBIT switch.
   Confirm that ON is displayed on the monitor display.

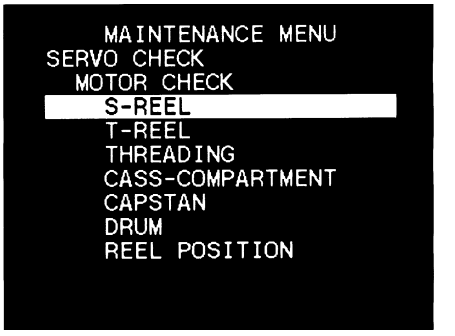


In the case of trouble :

If OFF is not displayed, check the sensor on the MIC arm.

2. MOTOR CHECK

The respective items of “MOTOR CHECK” are described below :



① S-REEL

Checks the S-reel motor.

1. Execute the S-REEL.
2. Press and hold the ⇧, ⇩ keys for one to two seconds, and release the reel brake by activating the brake solenoid. Confirm that the S reel motor rotates clockwise and counterclockwise respectively during pressing the ⇧, ⇩ keys.

In the case of trouble :

If the brake solenoid does not emit the operating sound and the S reel motor does not rotate in the specified direction even though pressing the ⇧, ⇩ keys, check the S reel motor assembly and reel motor driver circuit (SSS-12 board and DR-428BG board).

② T-REEL

Checks the T-reel motor.

1. Execute the T-REEL.
2. Press and hold the ⇧, ⇩ keys for one to two seconds, and release the reel brake by activating the brake solenoid. Confirm that the T reel motor rotates clockwise and counterclockwise respectively during pressing the ⇧, ⇩ keys.

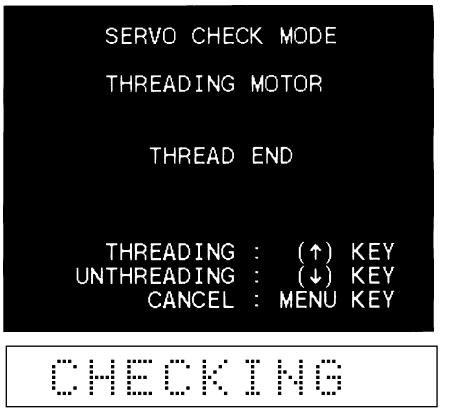
In the case of trouble :

If the brake solenoid does not emit the operating sound and the T reel motor does not rotate in the specified direction even though pressing the ⇧, ⇩ keys, check the T reel motor assembly and reel motor driver circuit (SSS-12 board and DR-428BG board).

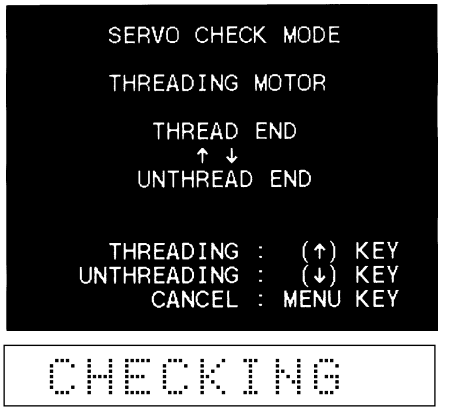
③ THREADING

Checks the threading motor, the thread-end sensor, unthread-end sensor and the cassette compartment.

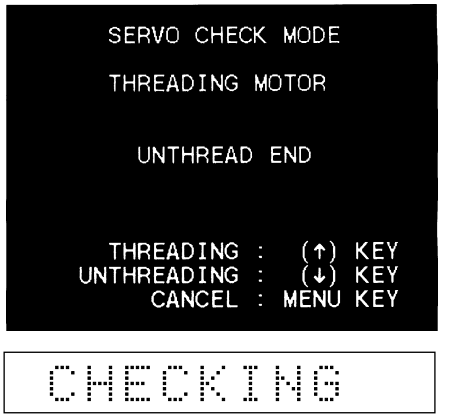
1. Execute the THREADING.



2. Press and hold the ⇧ key.
   Confirm that the threading ring completes threading and the message “THREAD END” appears on the monitor display.



3. Press and hold the ⇩ key.
   Confirm that the threading ring completes unthreading and “UNTHREAD END” appears on the monitor display.



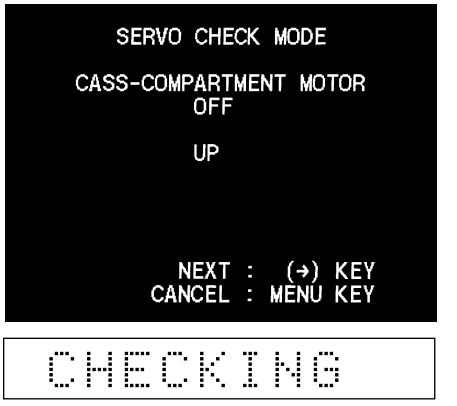
In the case of trouble :

If the threading motor does not rotate, or if the message “THREAD END” does not appear even though threading is complete, or if the message “UNTHREAD END” does not appear on the monitor even though the unthreading is complete, check the threading motor, the cassette compartment, the SSS-12 board. Check also the DR-428BG board (the driver circuit and the threading FG amplifier circuit) and the SE-521G board (the sensor).

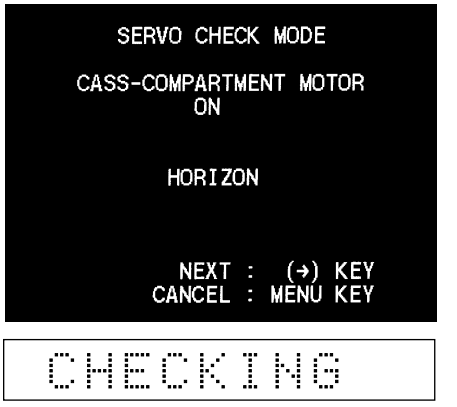
④ CASS-COMPARTMENT

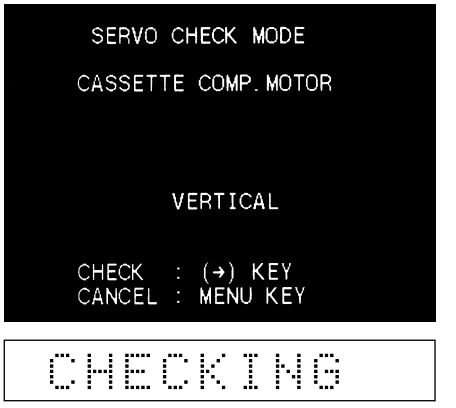
Check the cassette compartment motor.

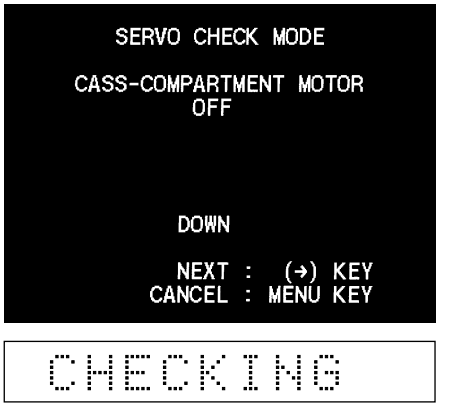
1. Execute the CASS-COMPARTMENT.



2. Press the ⇨ key.
   Confirm that the cassette compartment moves down.
3. Press the ⇨ key again, and confirm that the cassette compartment moves up.
   (The monitor display changes in the reverse order of the steps for moving down the cassette compartment.)







In the case of trouble :
If the monitor display does not change, check the cassette compartment motor, the SSS-12 board (the sensor input circuit) and the CC-83G board (the sensor).

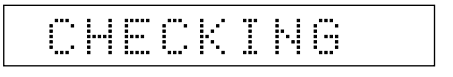
⑤ CAPSTAN

Checks the capstan motor.

1. Execute the CAPSTAN.

2. Press the ⇨ key.
   Confirm that [FORWARD ... OK] appears on the monitor display.

3. Press the ⇨ key again.
   Confirm that [REVERSE ... OK] appears on the monitor display.



In the case of trouble :

If the monitor display does not change, check the capstan motor and the capstan motor driver circuits (the SSS-12 board, DR-428BG board)

⑥ DRUM

Checks the drum motor.

1. Execute the DRUM.
2. Confirm the monitor display is as follows.
   SPEED : [OK]
   PHASE : [LOCK]
   PG : [EXIST]

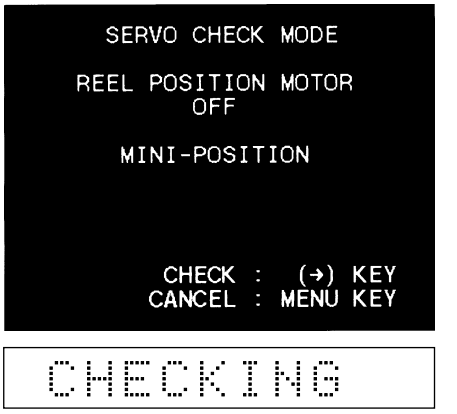
In the case of trouble :

If the monitor display does not change, check the drum motor, the DR-428BG board (the drum motor driver circuit, the drum FG amp circuit and the drum PG amp circuit).

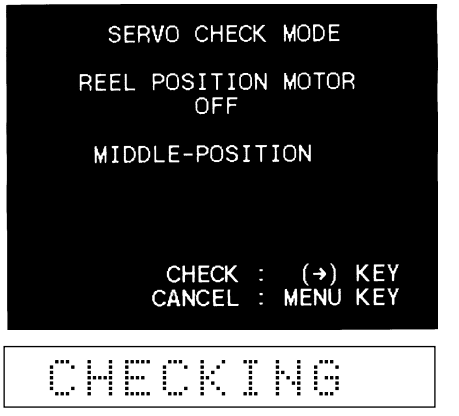
⑦ REEL POSITION

Checks the reel position motor and the reel MINI/M/STD position sensor.

1. Execute the REEL POSITION.



2. Confirm that the reel table moves in the order of the MINI position → the M position → the STD position then returning to the MINI position each time pressing the ⇨ key and the monitor display changes in accordance with the move.

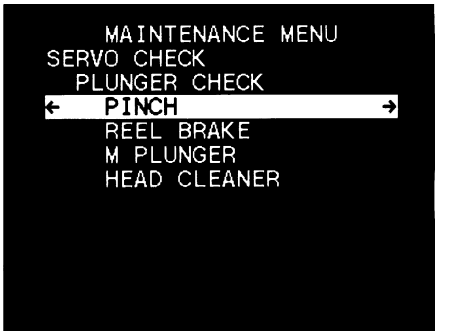


In the case of trouble :

If the reel table does not move or the monitor display does not change, check the reel position motor, the reel MINI/M/STD position sensor (the SE-522G and DR-428BG boards) and reel position motor driver circuit (the SSS-12 and DR-428BG boards).

3. PLUNGER CHECK

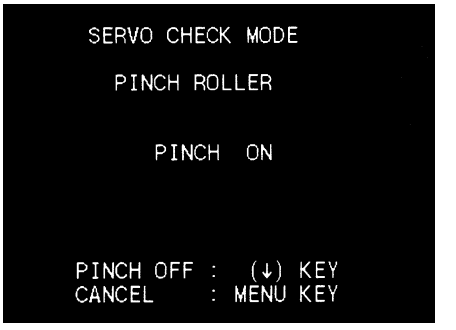
The respective items of “PLUNGER CHECK” are described below.

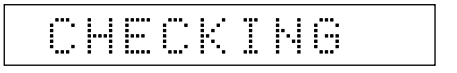


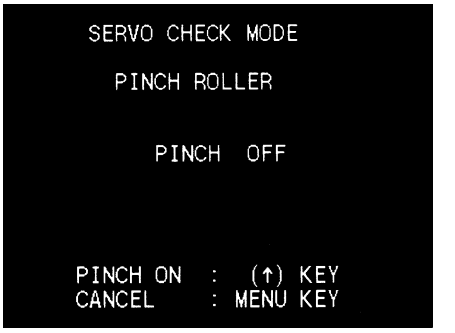
① PINCH

Checks the pinch roller solenoid.

1. Execute the PINCH and confirm that the pinch solenoid operates when the threading starts.
2. Press the ⇧, ⇩ keys to confirm that the PINCH comes to ON/OFF.
3. Press the MENU key to release the pinch solenoid and to bring to the unthreading.
   Doing so, the monitor display returns to the main menu.







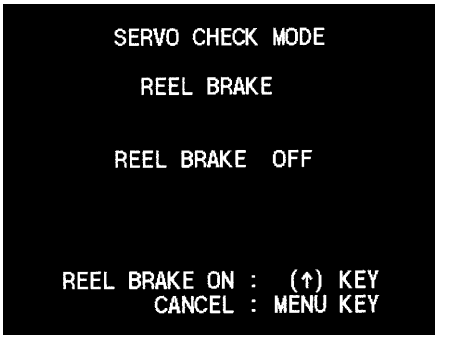
In the case of trouble :

If the pinch solenoid does not operate, check the pinch solenoid and the driver circuit (the DR-428BG board).

② REEL BRAKE

Checks the reel brake solenoid.

1. Execute the REEL BRAKE and confirm that the reel brake solenoid operates.
2. Press the ⇧, ⇩ keys to confirm that the REEL BRAKE comes to ON/OFF.
3. Press the MENU key to release the reel brake solenoid. Doing so, the monitor display returns to the main menu.



In the case of trouble :
If the reel brake solenoid does not operate, check the reel brake solenoid and its driver circuit (the DR-428BG board).

③ M PLUNGER

Checks the M plunger solenoid.

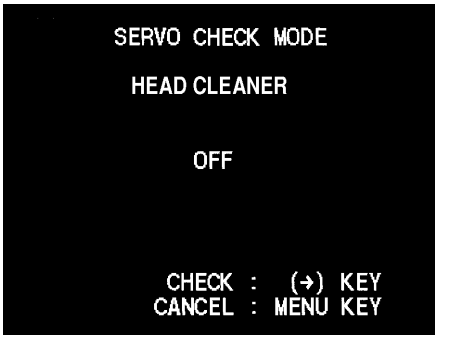
1. Execute the M PLUNGER.
2. Press the ⇧, ⇩ keys to confirm that the M PLUNGER comes to ON/OFF.
3. Press the MENU key to release the M plunger solenoid. Doing so, the monitor display returns to the main menu.

In the case of trouble :
If the M plunger solenoid does not operate, check the M plunger solenoid and its driver circuit (the DR-428BG board).

④ HEAD CLEANER

Checks the HEAD CLEANER solenoid.

1. Execute the HEAD CLEANER.
2. Press the ⇨ key to confirm that the HEAD CLEANER comes to OFF/ON.
3. Press the MENU key.
   Doing so, the monitor display returns to the main menu.



In the case of trouble:

If the HEAD CLEANER solenoid does not operate, check the HEAD CLEANER plunger solenoid and its driver circuit (the DR-428BG board).

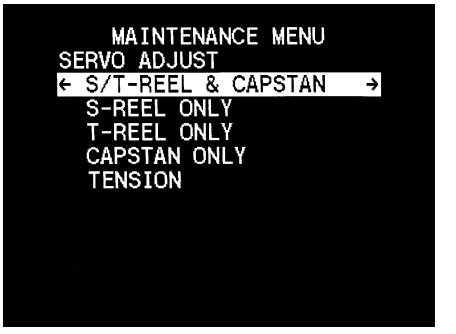
4-3-4. SERVO ADJUST

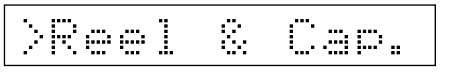
Checks the servo system automatically or semi-automatically.

Operating procedure

1. Enter the maintenance menu.
2. Move the cursor to “SERVO ADJUST” which is displayed with a white background using the ⇧, ⇩ keys.

3. Press the ⇨ key.
   “SERVO ADJUST” is selected and its lower-layer submenu appears.





4. Move the cursor displayed with a white background to a desired item using the ⇧, ⇩ keys.
5. Press the ⇨ key to select the desired item.
   (Refer to the respective menu description for the adjustment procedure.)
6. Press the SET (YES) key to execute the selected menu.
7. After completing the adjustment, press the ⇦ key to return to the main menu.
8. To check other menus and submenus, repeat steps 4 to 7.
9. Press the MENU key to exit the maintenance menu.

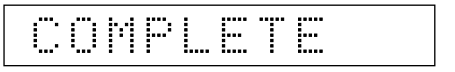
Note

If the MENU key is pressed while the adjustment is in progress, the adjustment operation is forcibly ended and the display returns to the main menu.

(1) S/T REEL & CAPSTAN

Executes the automatic adjustment of the S and T reels and, capstan systems.

1. Execute the S/T REEL & CAPSTAN.
2. After completing adjustment, confirm that “COMPLETE” appears.



Adjustment items

S REEL FG DUTY
S REEL OFFSET/FRICTION
S REEL TORQUE
T REEL FG DUTY
T REEL OFFSET /FRICTION
T REEL TORQUE
CAPSTAN FG DUTY

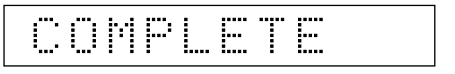
In the case of trouble :

When “ADJUST INCOMPLETE” appears on the monitor display, check the SSS-12 and DR-428BG boards (the reel FG amplifier circuit, reel motor driver circuit, capstan FG circuit and motor driver cicuit). Check also the respective motors.

(2) S-REEL ONLY

Executes the automatic adjustment of the S reel only.

1. Execute the S-REEL ONLY.
2. After completing adjustment, confirm that “COMPLETE” appears.



Adjustment items

S REEL FG DUTY
S REEL OFFSET/FRICTION
S REEL TORQUE

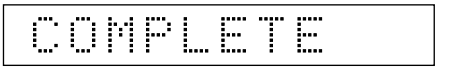
In the case of trouble :

When “ADJUST INCOMPLETE” appears on the monitor display, check the SSS-12 and DR-428BG boards (the reel FG amplifier circuit, the reel motor driver circuit) and the S-reel motor.

(3) T-REEL ONLY

Executes the automatic adjustment of the T reel only.

1. Execute the T-REEL ONLY.
2. After completing adjustment, confirm that “COMPLETE” appears.



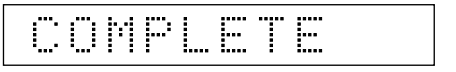
Adjustment items
T REEL FG DUTY
T REEL OFFSET/FRICTION
T REEL TORQUE

In the case of trouble :
When “ADJUST INCOMPLETE” appears on the monitor display, check the SSS-12 and DR-428BG boards (the reel FG amplifier circuit, the reel motor driver circuit) and the T-reel motor.

(4) CAPSTAN ONLY

Executes the automatic adjustment of the capstan FG only.

1. Execute the CAPSTAN ONLY.
2. After completing adjustment, confirm that “COMPLETE” appears.



Adjustment item
CAPSTAN FG DUTY

In the case of trouble :
When “ADJUST INCOMPLETE” appears on monitor display, check the SSS-12 and DR-428BG boards (the capstan motor driver circuit, the capstan FG amplifier circuit) and the capstan motor.

(5) TENSION

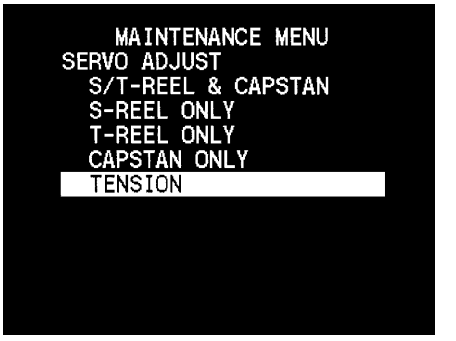
Executes the adjustment of the tape tension.

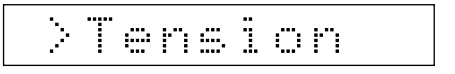
Mode
PLAY mode

Tool
DV torque cassette : J-6082-373-A

1. Remove the cassette compartment.
2. Turn on the main power and press the [EJECT] key.
   Note
   Make sure that the cassette compartment connection cable is not shorted to chassis when the main power is turned on.

3. Enter “MAINTENANCE MENU” and select “TENSION” from “SERVO ADJUST” using the ⇧, ⇩ keys.
4. Press the ⇨ key to move to the next display.





5. When the display appears, press the [SET (YES)] key to start the adjustment.

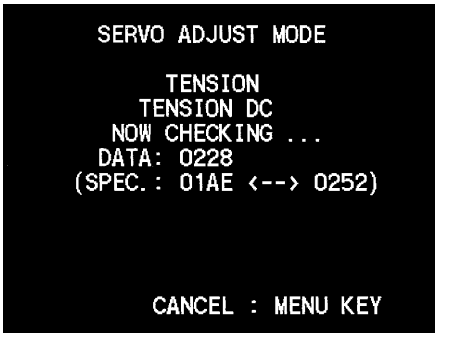
6. Wait until display changes and the menu appears as shown in the right.

7. Set the DV torque cassette and place a weight of about 300 g on it. Press the STOP key.

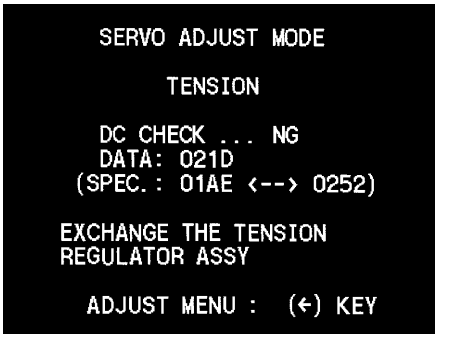
8. Keep pressing the ⇧, ⇩ keys until the DV torque cassette reading agrees with the specification value on display.
9. When adjustment is completed, press the ⇨ key.

Specification is as indicated on the display.

10. The display changes as shown in the right, and the HVR-1500 enters the tension regulator magnet position check mode.



11. If the check is completed unsatisfactorily, the display changes as shown in the right.
12. Replace the tension regulator assembly in accordance with message on the display.



13. If the check is completed satisfactorily, the display changes as shown in the right.
14. Keep pressing the ⇧, ⇩ keys until the DV torque cassette reading agrees with the specification value on the display.
15. When adjustment is completed, press the ⇨ key.
16. Repeat steps 14 and 15 to readjust the DV torque cassette reading.

Specification is as indicated on the display.

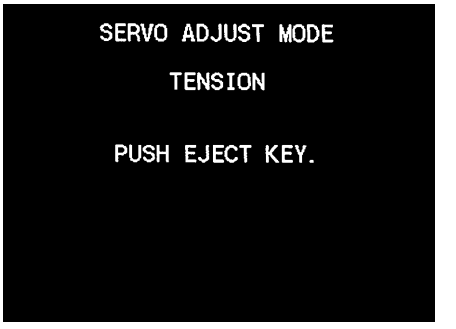
17. Confirm that the DV torque cassette reading agrees with the specification value on the display.
18. After completing step 17, press the ⇨ key and the HVR-1500 enters the REV mode automatically.

Specification is as indicated on the display.

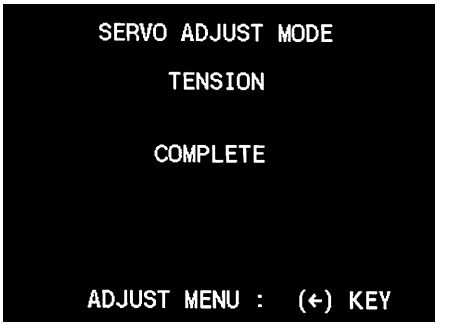
19. Keep pressing the ⇧, ⇩ keys until the REV holdback tension reading agrees with the specification value on the display.
20. When adjustment is completed, press the ⇨ key.

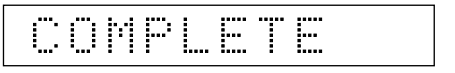
Specification is as indicated on the display.

21. Press the EJECT key and remove the DV torque cassette.



22. Confirm that the message “COMPLETE” appears on the display.





* Press the EJECT key to return to the ADJUST menu.
* When adjustment is complete, attach the cassette compartment.

4-3-5. TAPE PATH ADJUST

Executes the adjustment of the tape path.

(1) TRACKING ADJUST

For adjustment of “TRACKING ADJUST”, refer to Section 7-2.

(2) RF SWITCHING POSITION

For adjustment of “RF SWITCHING POSITION”, refer to Section 7-3.

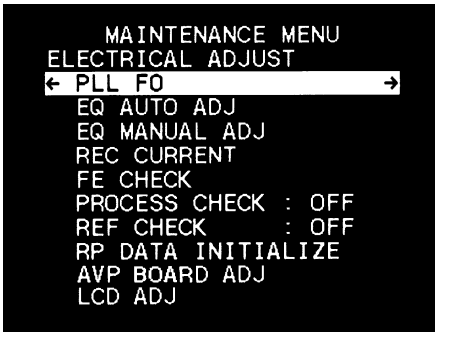
4-3-6. ELECTRICAL ADJUST

Executes the electrical adjustment.

Operating procedure

1. Enter the maintenance menu.
2. Move the cursor to “ELECTRICAL ADJUST” which is displayed with a white background using the ⇧, ⇩ keys.

3. Press the ⇨ key.
   “ELECTRICAL ADJUST” is selected and its lower layer submenu appears.

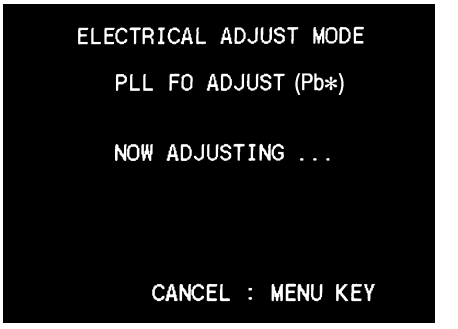


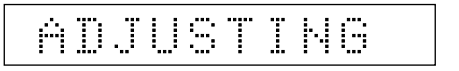
4. Move the cursor displayed with a white background to a desired item using the ⇧, ⇩ keys.
5. Press the ⇨ key to select the desired item.

1. PLL F0

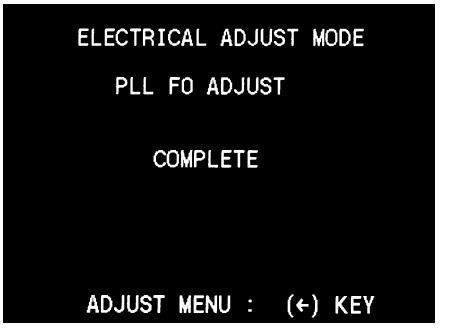
The PLL adjustment is described below :

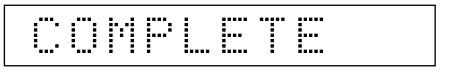
1. Select “PLL F0” and the PLL adjustment is performed automatically.





2. After completing the adjustment, confirm that “COMPLETE” appears.
3. Press the ⇦ key to return to the ADJUST menu.
4. Press the MENU key to exit the maintenance menu.





In the case of trouble :

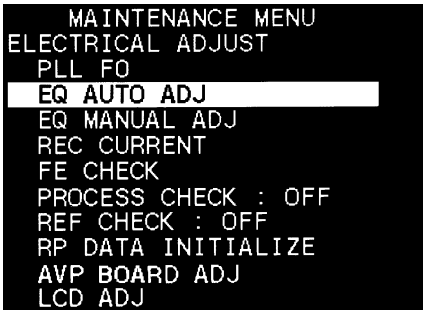
If “INCOMPLETE” appears on the monitor display, check the RP-133 board (the PLL circuit).

2. EQ AUTO ADJ

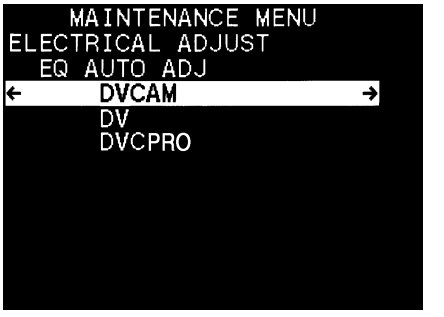
The EQ AUTO adjustment is described below :

① DVCAM

1. Select the EQ AUTO ADJ.



2. Move the cursor displayed with a white background to the DVCAM using the ⇧, ⇩ keys and press the ⇨ key.



3. After the monitor display comes out as shown right, insert the XH5-1A2 (for 60i) or XH5-1AP2 (for 50i) into the unit.
4. Press the PLAY key.
5. Confirm “COMPLETE” is displayed on the monitor.

To return to step 2, press the ⇦ key once.
To return to step 1, press the ⇦ key twice.
To return to the main menu, press the ⇦ key three times.

In the case of trouble :

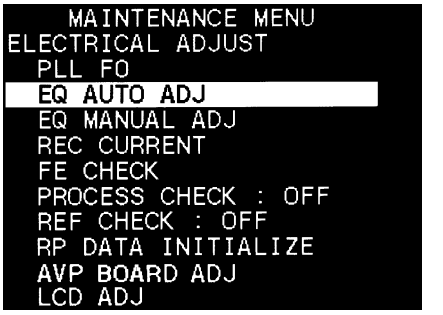
If “INCOMPLETE” is displayed on the monitor ;

① Send the small length of the tape forward and repeat step 2 again.

② If “INCOMPLETE” is still displayed after performing ①, check the RP-133 board (the EQ circuit).

② DV

1. Select the EQ AUTO ADJ.



2. Move the cursor displayed with a white background to the DV using the ⇧, ⇩ keys and press the ⇨ key.

3. After the monitor display comes out as shown right, insert the XH4-1A into the unit.
4. Press the PLAY key.
5. Confirm "COMPLETE" is displayed on the monitor.

To return to step 2, press the ⇦ key once.
To return to step 1, press the ⇦ key twice.
To return to the main menu, press the ⇦ key three times.

In the case of trouble :

If "INCOMPLETE" is displayed on the monitor ;

① Send the small length of the tape forward and repeat step 2 again.
② If "INCOMPLETE" is still displayed after performing ①, check the RP-133 board (the EQ circuit).

③ DVCPRO

Note

When the adjustment EQ AUTO ADJ of the DVCAM is executed, the exactly same adjustment data is automatically reflected. Therefore, do not execute this adjustment in the DVCPRO.

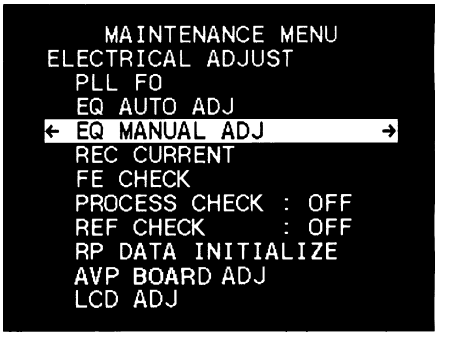
3. EQ MANUAL ADJ

The EQ MANUAL ADJUSTMENT is described below :

Note

If any errors are found in the played back picture and audio, or if "INCOMPLETE" is displayed after completing the EQ AUTO ADJ in the previous section, this adjustment enables to check the status of the RF of each HEAD.

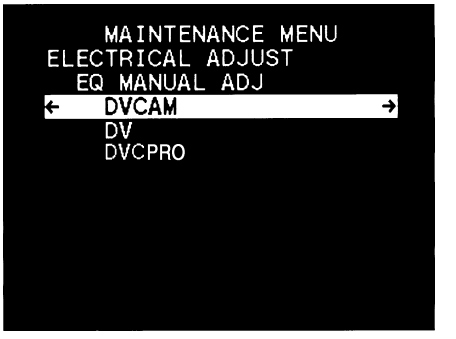
1. Select the EQ MANUAL ADJ.



2. Select the mode desired to check using the ⇧, ⇩ keys, and press the ⇨ key.

   Note

   DVCPRO is factory use. Never change the setting.



3. Insert the cassette of which mode you desire to check into the unit.
   DVCAM : 15 µ ADJ cassette
   DV : 10 µ ADJ cassette

4. Press the PLAY key.
5. Press the RESET (NO) key to display asterisk mark "∗" to the right side of the DATA : XXXX.
6. Select the HEAD for checking with the ⇨ key.

   Note

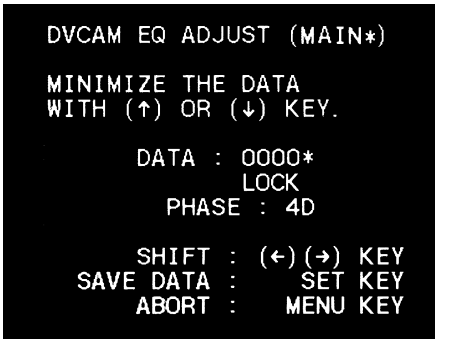
   The HEAD selected is displayed in the ( ) on the top of the monitor display.

   In the case of DVCAM :

   Main E → Main O

   In the case of DV :

   Main E → Main O



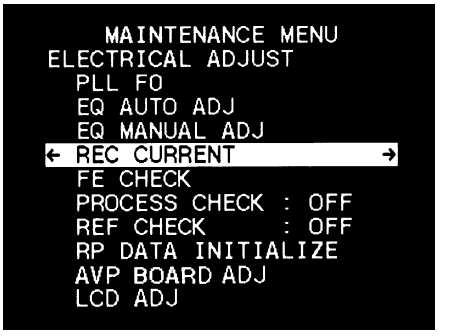
7. Confirm that the DATA on the screen is 0000∗ through 000F∗.

   Note

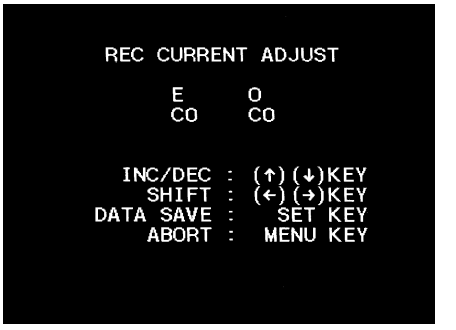
   If press the SET (YES) key during confirmation, perform the EQ AUTO adjustment.

4. REC CURRENT

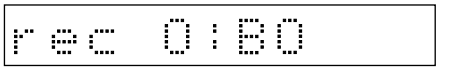
1. Selected the REC CURRENT.



2. Press the ⇧, ⇩ keys and the ⇦, ⇨ keys to adjust the data to "B0".



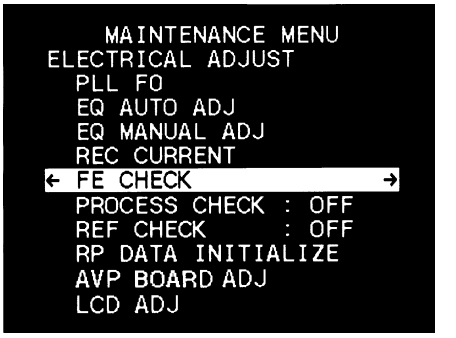
or



3. Press the SET (YES) key to save the data.

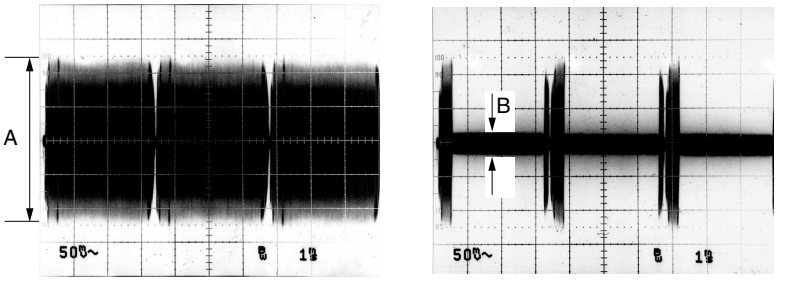
5. FE CHECK

1. Insert a blank tape.
   (Press the keys in this order : TC PRESET, RESET (NO) and SET (YES) keys, to set the time counter to 00, which facilitates the operation.)
2. Connect an oscilloscope as follows :
   Check : TP202/RP-133 board
   GND : E201/RP-133 board
   TRIG : TP201/RP-133 board
3. Select the FE CHECK.



4. Select REC using the ⇧ key. Press the PLAY and REC keys.
   After recording for 30 to 60 seconds (time counter reading), press the STOP key.
5. Playback the recorded segment and note down the waveform level.

6. Select FE ONLY using the ⇧ key. Locate the tape segment that is recorded in step "4", and press the PLAY and REC keys to record (i.e., erase) the recorded segment for about 30 seconds.
7. Playback the segment recorded (erased) in step 6. and confirm that the waveform level is 30% or less.
   Note
   Only the video sub-code is erased.



$B \leqq A \times 0.3$

6. PROCESS CHECK

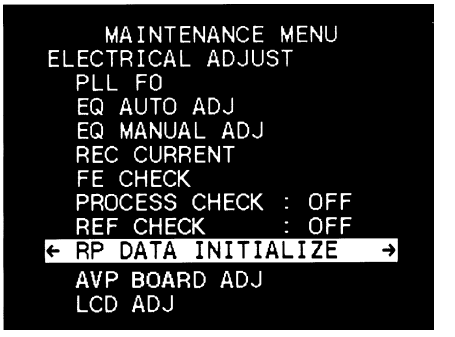
* This menu is for the factory use only.

7. REF CHECK

* This menu is for the factory use only.

8. RP DATA INITIALIZE

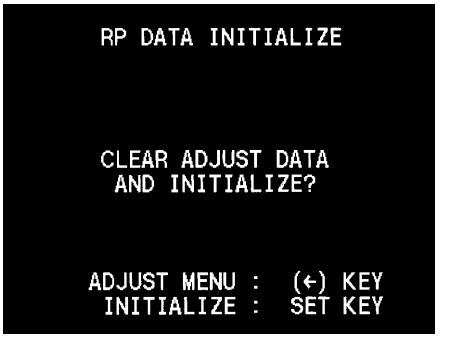
1. Select the RP DATA INITIALIZE.



2. As “RP DATA INITIALIZE” will be displayed on the screen, press the SET (YES) key when initializing the adjusted data.

   Note

   After initialization, be sure to perform the following three adjustments in Section “4-3-6. Electrical Adjust.”
   1. PLL F0
   2. EQ AUTO ADJ
   4. REC CURRENT



9. AVP BOARD ADJ

For adjustment of “AVP BOARD ADJ”, refer to Section 8-3.

10. LCD ADJ

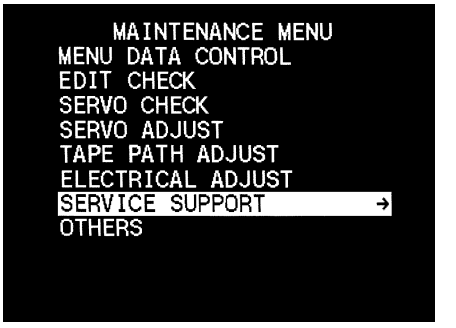
For adjustment of “LCD ADJ”, refer to Section 8-5.

4-3-7. SERVICE SUPPORT

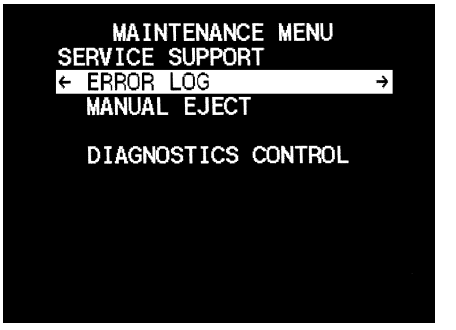
Displays the error codes and error contents which occurred in the past and provides the diagnosis.

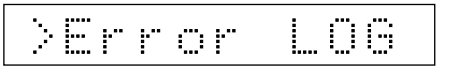
Operating procedure

1. Enter the maintenance menu.
2. Move the cursor to “SERVICE SUPPORT” which is displayed with a white background using the ⇧, ⇩ keys.



3. Press the ⇨ key.
   “SERVICE SUPPORT” is selected and its lower layer sub-menu appears.





4. Move the cursor displayed with a white background to a desired item using the ⇧, ⇩ keys.
5. Press the ⇨ key to select the desired item.
   (Refer to the respective menu description for the check procedure.)
6. After completing the check, press the MENU key to return to the main menu.
7. To check other menus and submenus, repeat steps 4 to 6.
8. Press the MENU key to exit the maintenance menu.

1. ERROR LOG

The errors which occurred in the past are displayed.
(The latest eight maximum errors are displayed.)

* The latest error is displayed on the top.

Note

The servo system errors only are stored here. The ERROR-91, 92, 93, 94 and 95 are not stored.

2. MANUAL EJECT

For the operating procedure of how to take out a tape when the EJECT is inoperable, refer to Section 2-4.

3. DIAGNOSTICS CONTROL

① CLEAR ERROR LOG

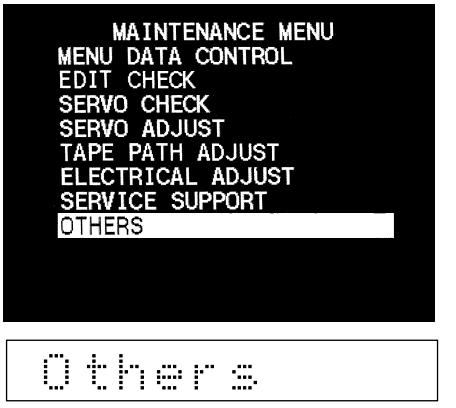
Clears the error history from the ERROR LOG.

4-3-8. OTHERS

Enables to display the software version, check the keyboard and others.

Operating procedure

1. Enter the maintenance menu.
2. Move the cursor to “OTHERS” which is displayed with a white background using the ⇧, ⇩ keys.



3. Press the ⇨ key.
   “OTHERS” is selected and its lower layer submenu appears.

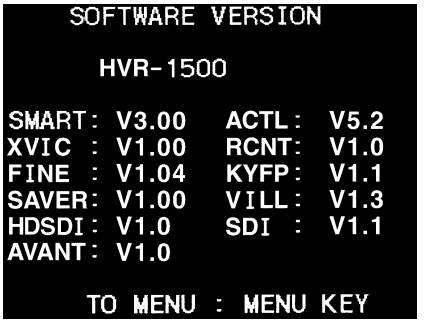
4. Move the cursor displayed with a white background to a desired item using the ⇧, ⇩ keys.
5. Press the ⇨ key to select the desired item.
   (Refer to the respective menu description for the check procedure after execution.)
6. After completing the check, press the MENU key to return to the main menu.
7. To check other menus and submenus, repeat steps 4 to 6.
8. Press the MENU key to exit the maintenance menu.

(1) SOFTWARE VERSION

Displays the model information and software version numbers.

SY: IC501 on the SSS-12 board.
SV: IC202 on the SSS-12 board.
SP: IC501 on the SSS-12 board.
KY: IC301 on the KY-616 board.
MO: IC201 on the HPR-20 board.
MENU: IC539 on the SSS-12 board.

Press the ⇨ key to display the version below.
SMART: IC401 on the SSS-12 board.
XVIC: IC202 on the DDE-22 board.
FINE: IC154 on the AVP-7 board.
SAVER: IC805 on the DVP-42 board.
HDSDI: IC705 on the SDI-94 board.
AVANT: IC1001 on the DVP-42 board.
ACTL: IC154 on the AVP-7 board.
RCNT: IC200 on the RT-10 board.
KYFP: IC507 on the KY-616 board.
VILL: IC1203 on the HPR-20 board.
SDI: IC601 on the SDI-94 board.

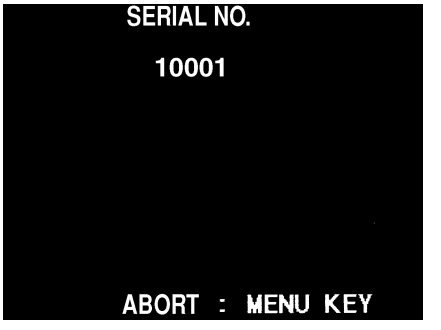


* The message NONE appears for the XVIC when the option HVBK-1505 is not installed in the HVR-1500.
* Contents which are shown in the time counter display can be changed using the ⇧, ⇩ keys.
* Press the ⇦ key or the MENU key to return to the maintenance menu.

(2) SERIAL NO.

Displays the serial number of this unit.

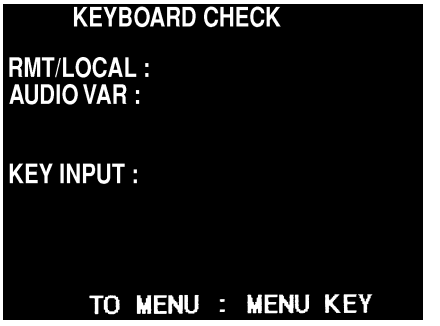
* Press the MENU key to return to the maintenance menu.



(3) KEYBOARD CHECK

Check the buttons and knobs in the front panel.

LEDs of the front panel: All lights up.
LCD monitor: Test mode display



Press the EJECT key.
RMT/ LOCAL: Operation checks of the remote control switch.
AUDIO VAR: Operation checks of the VARIABLE switch.
KEY INPUT: Operation checks of the keys in the front panel.

* Press the MENU key to return to the maintenance menu.

(4) MEMORY DISPLAY

* Factory use only.

(5) DATA DISPLAY

* Factory use only.

Section 5
Periodic Inspection and Maintenance

5-1. Periodic Inspection List

The following table shows the reference parts replacement time which is not the warranty time of parts.
Refer to the following table to establish the periodic inspection schedule which realizes the full performance and function of a unit and to extend life of a tape. The actual parts replacement period depend on the operating environment and conditions of a unit.

☆ : Part replace ◇ : Check (Adjustment) ○ : Cleaning

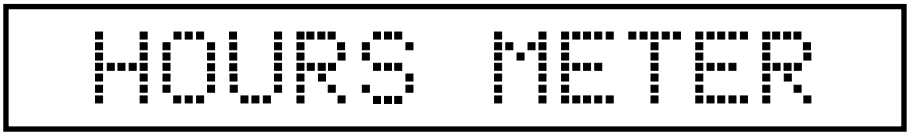
Inspection items			Hours meter	Inspection time (Hours)			
Item	**Part No.**	**Name**	**Menu No.**	**2000**	**4000**	**6000**	**8000**
Drum assembly	⚠ A-8320-778-C	DEH-13B-R	T2	☆	☆	☆	☆
Tape drive system blocks							
Pinch solenoid	A-8279-203-F	Pinch Solenoid assembly	T2	–	–	–	◇
Brake solenoid	1-454-930-22	Plunger solenoid	T2	–	–	–	◇
Reel motor (T)	⚠ A-1141-580-A	DC motor (SRD14B/J-RP)	T2	◇	◇	◇	◇
Reel motor (S)	⚠ A-1141-581-A	DC motor (SRD15B/J-RP)	T2	◇	◇	◇	◇
Loading motor	A-8279-202-C	LD motor assembly	T2	–	◇	–	◇
Reel sift motor	A-8279-204-B	RS motor assembly	T2	–	◇	–	◇
T reel brake shoe	⚠ A-1141-580-A	DC motor (SRD14B/J-RP)	T2	◇	◇	◇	◇
S reel brake shoe	⚠ A-1141-581-A	DC motor (SRD15B/J-RP)	T2	◇	◇	◇	◇
Head cleaner solenoid	⚠ 1-454-942-32	Plunger solenoid	T2	–	–	–	◇
M stop solenoid	⚠ 1-454-932-22	Plunger solenoid	T2	–	–	–	◇
Tape path system blocks							
Capstan motor	⚠ A-1141-582-A	DC motor (SCD16B/J-RP)	T2	◇○	◇○	◇○	◇○
Pinch roller	A-8279-201-E	Pinch limiter assembly	T2	☆	☆	☆	☆
Guide roller T2	A-8279-024-L	Shuttle (R) assembly	T2	◇○	◇○	◇○	◇○
Guide roller T3	A-8279-026-F	T drawer arm assembly	T2	○	○	○	◇○
Guide roller T4	A-8279-400-C	TG-8 arm assembly	T2	○	○	○	◇○
Guide roller S2	A-8279-023-L	Shuttle (L) assembly	T2	◇○	◇○	◇○	◇○
Guide roller S3	A-1156-785-A	Tension regulator G assembly	T2	○	○	○	◇○
Guide roller S4	A-8279-399-D	TG-1 arm assembly	T2	○	○	○	◇○
Tape running surface (including tape cleaner)	——	——	——	○	○	○	○
Head cleaner	X-3605-665-3	HC roller assembly		☆	☆	☆	☆
Others							
Cassette memory terminal	A-8323-659-C	MIC holder assembly	T2	◇○	◇○	◇○	◇○

T2 : DRUM ROTATION

5-2. Hours Meter

The hours meter data is displayed on the monitor display and the time counter display area.
Therefore, the hours meter data cannot be checked without turning on the main power to the unit.
Periodic inspection is recommended to be performed using the hours meter reading.

HOURS METER



The hours meter has the four types of display mode. The accumulated elapsed hours of operation or accumulated times of operation are displayed in the respective modes. The T2, T3 and CT modes have both of resettable accumulation counter and un-resettable accumulation counter.

Note

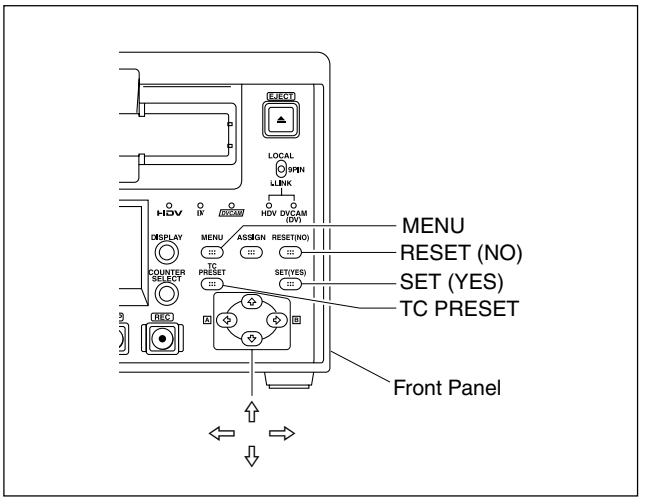
The actual hours and times are obtained by multiplying the displayed number by 10.

Modes	Contents of display
T1 : OPERATION	Accumulated hours of power on
T2 : DRUM ROTATION	Accumulated hours of drum rotation at the threaded-end position
T3 : TAPE RUNNING	Accumulated hours of tape running in the respective modes of fast forward, rewind, playback, search, record and edit (except for the still mode during search)
CT : THREADING	Numbers of times of threading and unthreading

Example : The following display indicates that the accumulated hours of drum rotation at the threaded-end position is 1500 hours.

5-2-1. Displaying Hours Meter Information

1. Press the MENU key on the front panel.



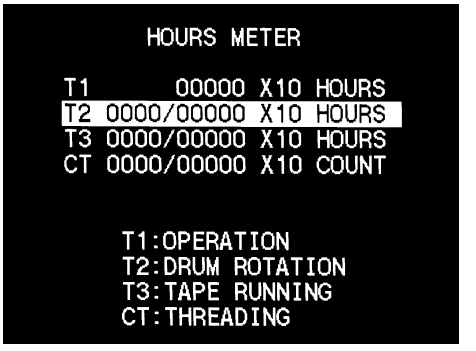
2. Select HOURS METER using ⇧, ⇩ keys, and press the ⇨ key.
3. All of the hours meter information of T1, T2, T3 and CT appear on the monitor screen.
4. Either one of T1, T2, T3 or CT is displayed on the time counter display area. Select another item using the ⇧, ⇩ keys.
5. When the mode of T2, T3 or CT is selected, the resettable hours meter value appears first.
6. The un-resettable hours meter value is displayed while the ⇨ key is kept pressed.

   Note

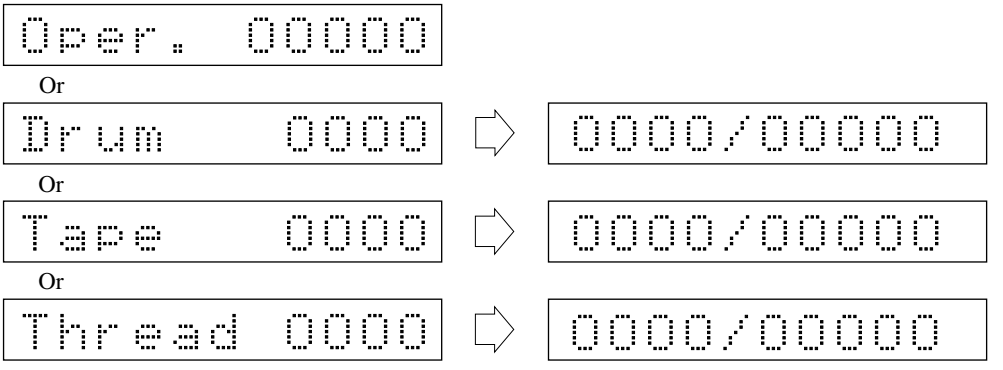
   When the hours meter value becomes larger and exceeds the limit of display, " ------ " will appear.

7. Press the MENU key again to return to the original mode.

[Monitor screen]



[Counter display area]

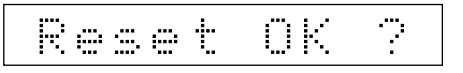


5-2-2. How to Reset Hours Meter

1. Set the switch S401-1 on the SSS-12 board to ON.
2. Press the MENU key.
3. Select HOURS METER using ⇧, ⇩ keys, and press the ⇨ key.
4. Select the desired item to reset using ⇧, ⇩ keys.
5. When the RESET (NO) key is pressed, the display changes to “0000” which blinks.
6. When the SET (YES) key is pressed, a message appears requesting approval to reset, on the monitor.
7. To reset the memory, press the SET (YES) key again to exit the hours meter display mode.

   Note

   The following message appears while saving data into memory during reset.
   If the main power is turned off while the message appears, the memory will not be reset correctly. Do not turn off the main power while the display appears.



8. Set the switch S401-1 on the SSS-12 board to OFF.

5-3. Cleaning

Perform the following maintenance work regardless of the operating hours of the unit, after repairing it.

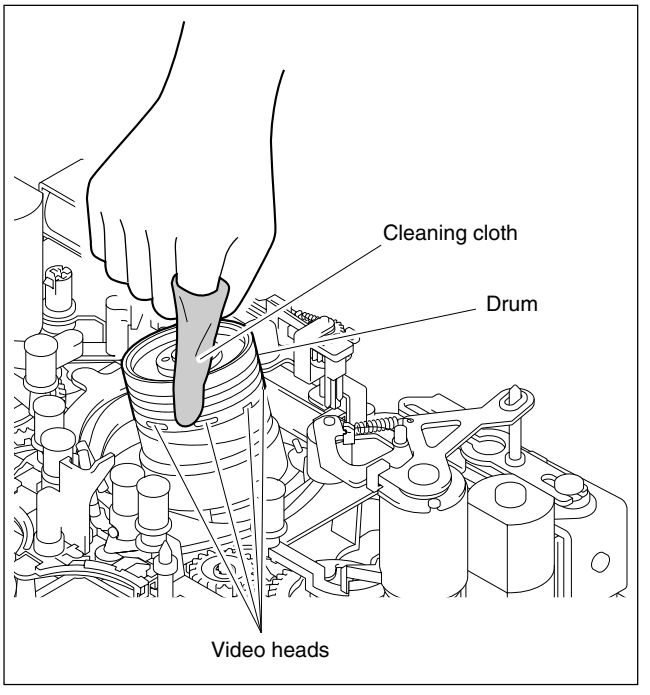
1. Video head cleaning
   (Refer to Section 5-3-1 for cleaning procedure.)
2. Tape running path cleaning
   (Refer to Section 5-3-2 for cleaning procedure.)

Note

After a unit is cleaned, insert a cassette after cleaning fluid is dried completely.

5-3-1. Video Head Cleaning Procedure

Bring a cleaning cloth moistened with cleaning fluid in contact with the head tip gently, and rotate the drum slowly with hand for cleaning.



Notes

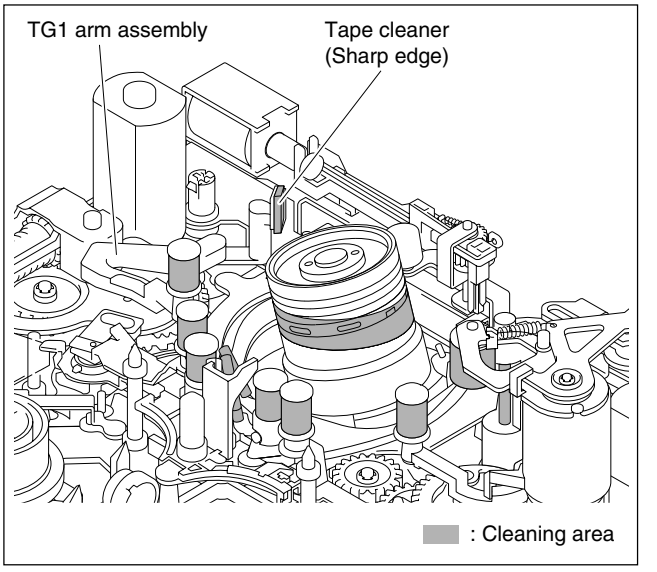
- Never move the cleaning cloth in vertical direction with respect to the drum rotation (up and down with respect to the drum) during cleaning.
- After cleaning, wipe off moisture using a dry cleaning cloth.
- Turn off the main power before cleaning a unit.

5-3-2. Tape Running Path Cleaning

Clean the tape guide, drum, capstan, pinch roller, tape cleaner and other parts which contact with video tape, with cleaning cloth moistened with cleaning fluid.

Notes

- Be careful of the tape cleaner during cleaning because it has sharp edge.
- After cleaning, wipe off moisture using a dry cleaning cloth.

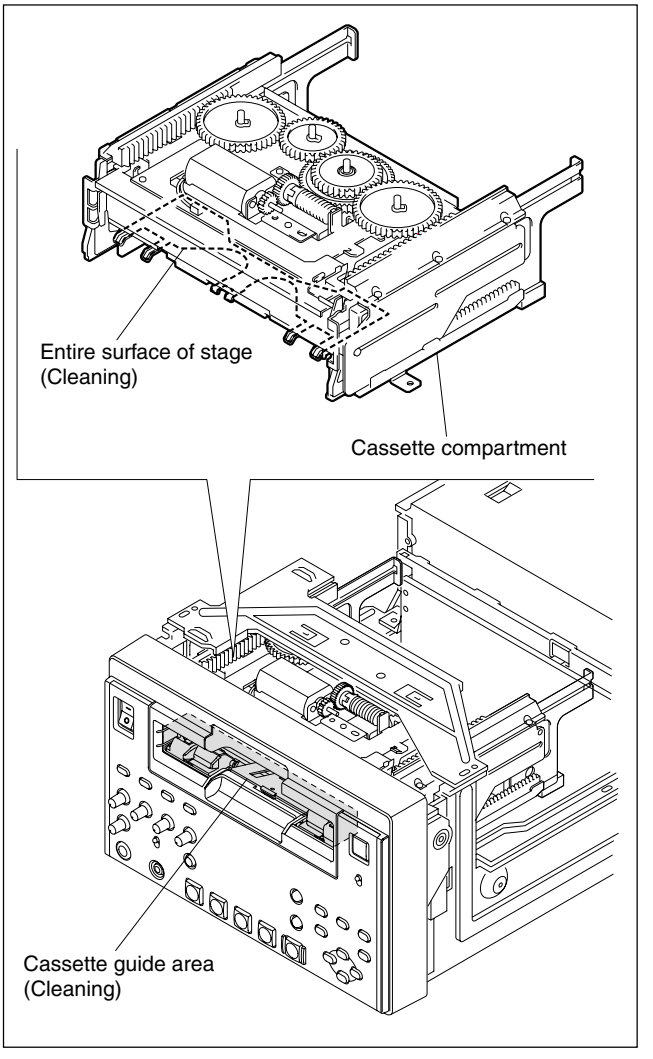


5-3-3. Cassette Compartment Entrance Cleaning

Clean the area around the cassette guide of the front panel and entire surface of the stage of the cassette compartment as shown using cleaning cloth moistened with cleaning fluid.

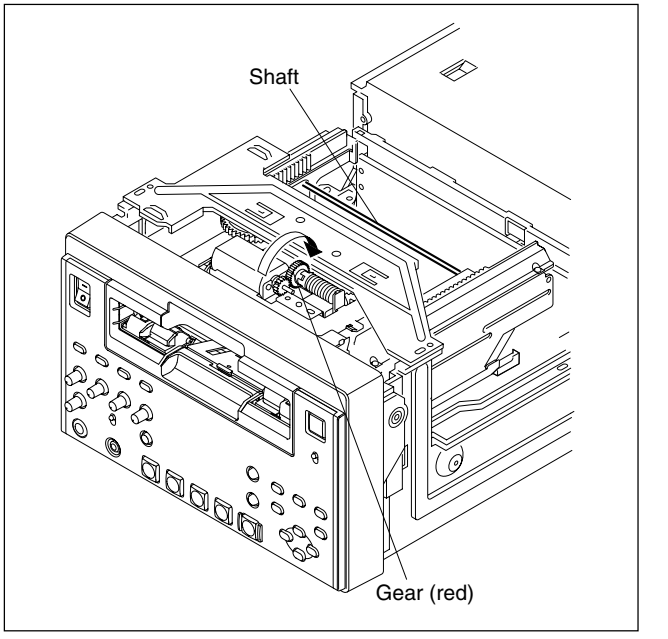
Note

Remove the cassette compartment when cleaning a unit to prevent foreign materials from dropping into a unit.



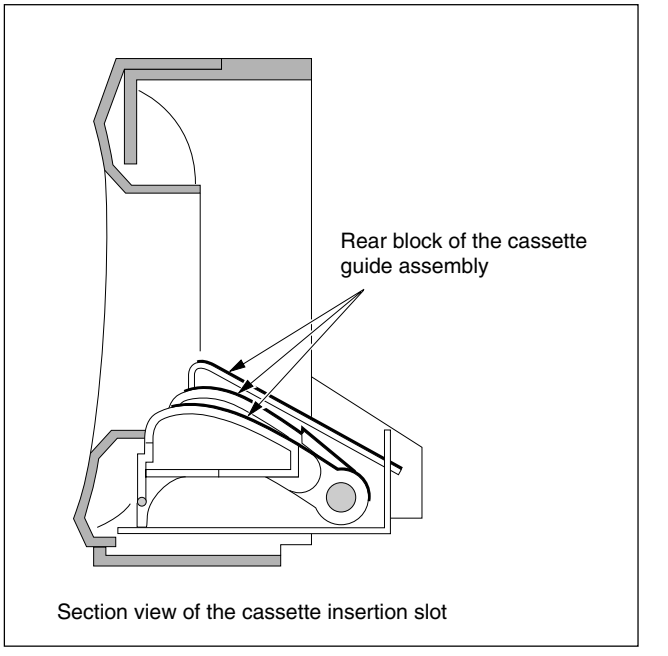
5-3-4. Cassette Compartment Shaft Cleaning

Turn the gear (red) in the arrow direction until you can see the shaft. Clean the shaft with a cleaning cloth moistened with a cleaning fluid.



5-3-5. Cassette Guide Assembly Cleaning

Clean the rear block of the cassette guide assembly with a cleaning cloth moistened with a cleaning fluid.



Section 6
Replacement of Mechanical Parts

6-1. General Information on Parts Replacement and Adjustment

6-1-1. Preparation Before Starting Parts Replacement

- Remove the ornamental parts as needed.
- When replacing parts or performing mechanical adjustment, remove the cassette compartment from the HVR-1500 not so far as specified. (Refer to Section 2-8.)
- When the connector of the cassette compartment is removed, the protection circuit starts functioning. Refer to section "2-6. Operating the VTR without a Cassette Tape." to operate the HVR-1500 without the cassette compartment.

6-1-2. Drum Assembly

- The drum assembly is a periodic replacement part. The drum should be replaced in accordance with the periodic replacement list.
- The drum assembly must be replaced in the following cases :
  (1) When the video heads are worn out so that the proper tape-to-head contact is lost and recording and playback cannot be performed correctly;
  (2) When the rabbet guide of the lower drum is worn out so that the correct RF envelope cannot be obtained even after adjusting the tape path to optimize the tracking.
  (3) When the rabbet guide or tape running surface of the lower drum is damaged;
  (4) If the drum rotation is abnormal and the VTR does not work properly due to noise or jitter.

6-1-3. Grease

Be sure to use only the authorized grease.
If grease other than the authorized one is used, major malfunctions may result due to differences in grease viscosity and its ingredients.
If grease containing dirt is used, the shafts and bearings may be damaged and major malfunctions may result.

Use the following grease for the HVR-1500 :

Grease (SG941 (20 g)) : 7-662-001-39

- Do not apply grease to any parts other than the specified parts.
- Apply just enough grease to cover a coating on the surface.
  Wipe off any grease that oozes out into the surrounding parts with gauze or a soft cloth.

6-1-4. Tightening Torque and Handling of Washers

1. Screwdrivers and Tightening Torque of Screws

Many M1.4 and M2 screws are used in the HVR-1500.
Be sure to use the authorized tools to loosen and tighten them.
In addition, use a torque screwdriver to tighten the screws with the specified tightening torque.

Torque screwdriver bit (for M 1.4) :	J-6325-110-A
Torque screwdriver bit (for M 2) :	J-6325-380-A
Hexagon bit (for torque screwdriver) :	J-6326-120-A
Torque screwdriver (for 3 kgf•cm) :	J-6325-400-A

Tightening torque

For M1.4 screw :	0.1 N•m (1.0 kgf•cm)
For M2 screw :	0.2 N•m (2.0 kgf•cm)

Note

The HVR-1500 uses many small screws that easily fall inside the machine when removing and re-assembling parts. To avoid this risk, magnetize the screwdriver bit slightly enough to prevent small screws from falling into the machine. However, when installing the drum assembly, never use a magnetized screwdriver.

2. Stop Washer and E ring

Do not use old stop washers and E rings that have been removed.
Always use new stop washers and E ring to attach the parts.

Stop washer (1.5) :	3-669-465-01
Stop washer (2.3) :	3-669-596-01
E ring (2.3) :	7-624-105-04
Cotter polyethylene washer :	3-321-813-01
Polyslider washer (Ø2.0) :	3-701-437-01

How to Remove the Stop Washers and E ring

Use the following fixtures to remove stop washers and E ring.
Washer extracting fixture (A) : J-6082-234-A

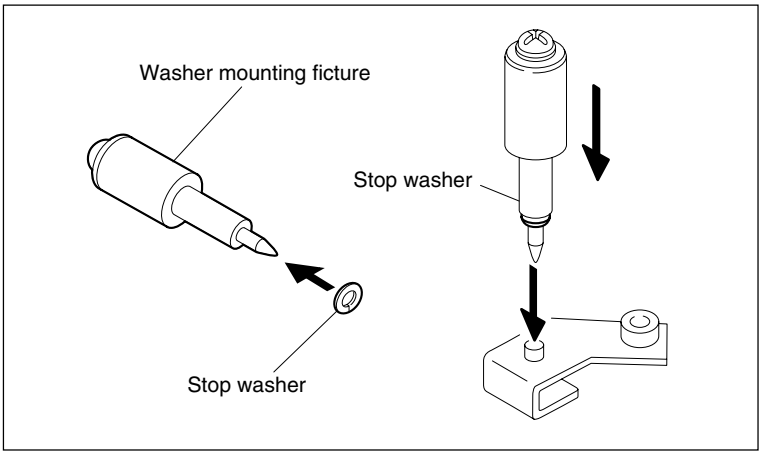
Notes

- Be careful not to drop the stop washers and E ring inside the HVR-1500.
- Be careful not to let tools touch other parts, especially the drum.

How to Attach the Stop Washers

Use the following tools to attach stop washers :
Washer mounting fixture Ø1.5 : J-6082-231-A
Washer mounting fixture Ø1.2 : J-6082-232-A
Washer mounting fixture Ø0.8 : J-6082-233-A

(a) Insert a stop washer to the tip of the washer mounting fixture.
(b) Set the thin tip of the mounting fixture perpendicularly to the top of the shaft to which the stop washer is to be installed.
(c) Press the thick portion of the fixture downward to install the stop washer onto the shaft.



6-2. Drum Replacement

Outline

Replacement

Disconnecting the connectors
Removing the head cleaner assembly
Replacing the drum assembly
Reattaching the head cleaner assembly
Reconnecting the connectors
Cleaning the heads and tape running surface

Adjustment after replacement

Tape path adjustment
RF switching position adjustment
EQ adjustment

Note

Take care not to damage the tape guides around the drum assembly, tape running surface on the drum, video heads of the drum assembly and so on when replacing the drum assembly.

Basic Knowledge

Besides the periodic replacement, replace the drum assembly in the following cases.

- When no proper RF waveform can be obtained even if tracking adjustment is performed.
- When the damaged tape running surface on the drum cannot be recovered.

Preparations

1. Set the unit into the unthreading end status.
2. Power off the unit.
3. Remove the top plate. (Refer to Section 2-7-1.)
4. Remove the bottom plate. (Refer to Section 2-7-2.)
5. Remove the cassette compartment assembly. (Refer to Section 2-8.)

Tool

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A

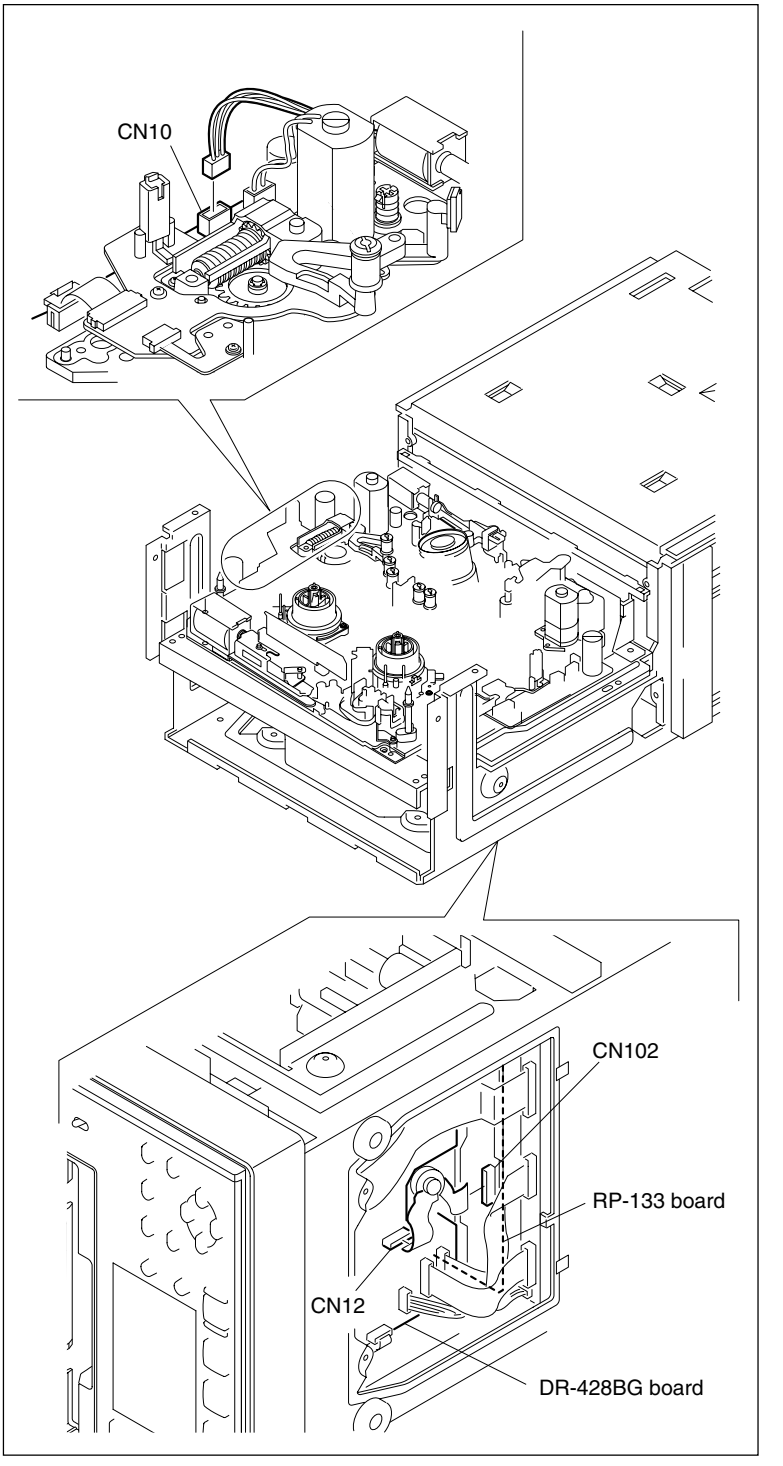
1. Disconnecting the connectors

(1) Remove the harnesses and flexible card wires that are connected to the two connectors (CN10, CN12) on the DR-428BG board of the back of the chassis.

(2) Remove the flexible card wire connected to the connector (CN102) on the RP-133 board.

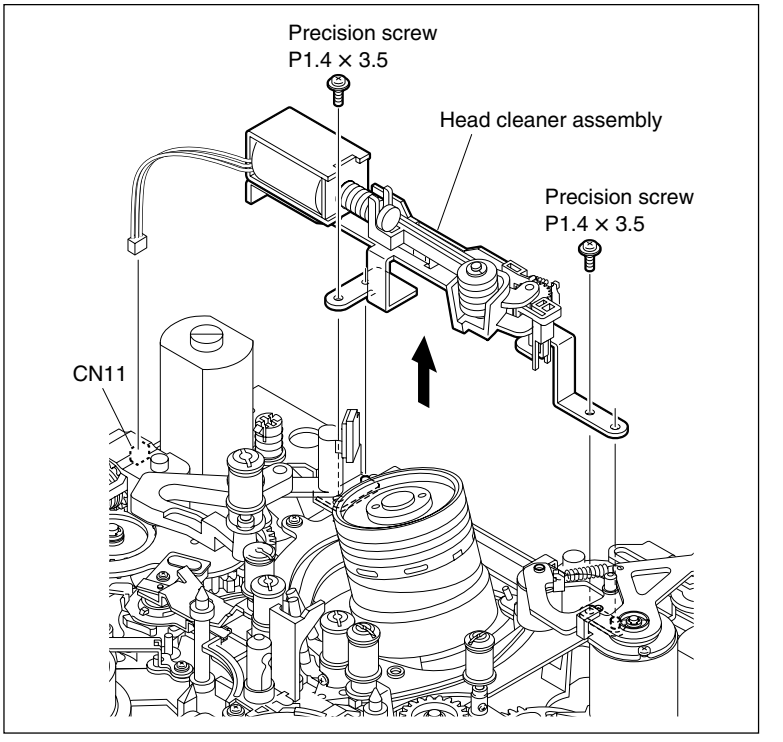
Note

When disconnecting the connector, take extra care not to injure your hands with the chassis, etc.



2. Removing the head cleaner assembly

(1) Disconnect the harness from the connector (CN11) on the DR-428BG board with tweezers.
(2) Remove the two precision screws, and remove the head cleaner assembly in the direction of the arrow.



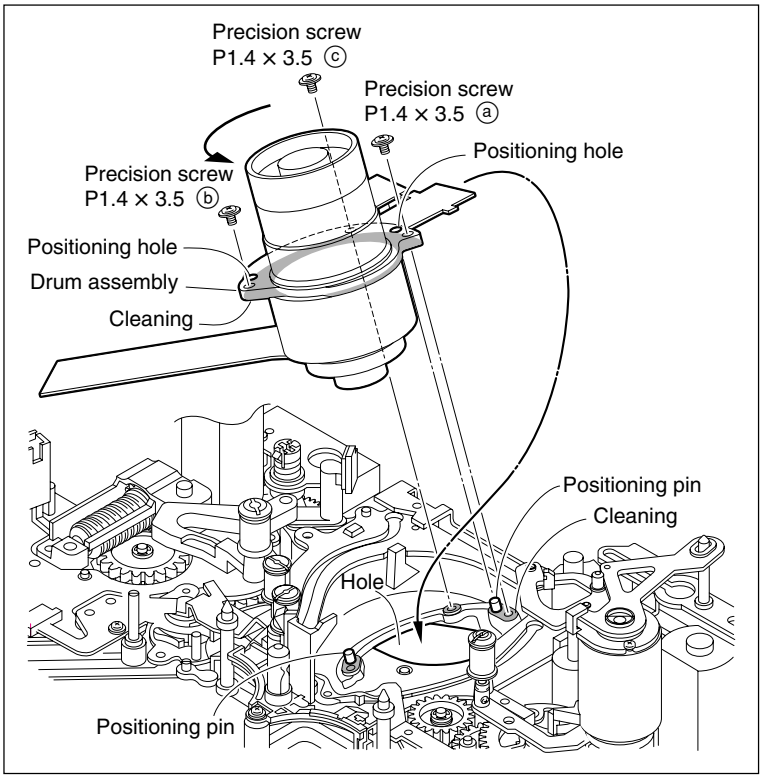
3. Replacing the drum assembly

(1) Remove the three precision screws, and remove the drum assembly from the MD chassis.

Note

Take care not to contact the drum assembly to the peripheral tape guides.

(2) Clean the installation surfaces of a new drum assembly and MD chassis with a cleaning cloth moistened with cleaning fluid.
(3) Put the five flexible card wires into the hole on the MD chassis, and align the two positioning pins on the MD chassis with the holes of the drum assembly.
(4) While moving the drum assembly in the direction of the arrow (counterclockwise direction), tighten the three precision screws in the order of ⓐ, ⓑ, ⓒ.
Tightening torque : 0.1 N•m {1 kgf•cm}



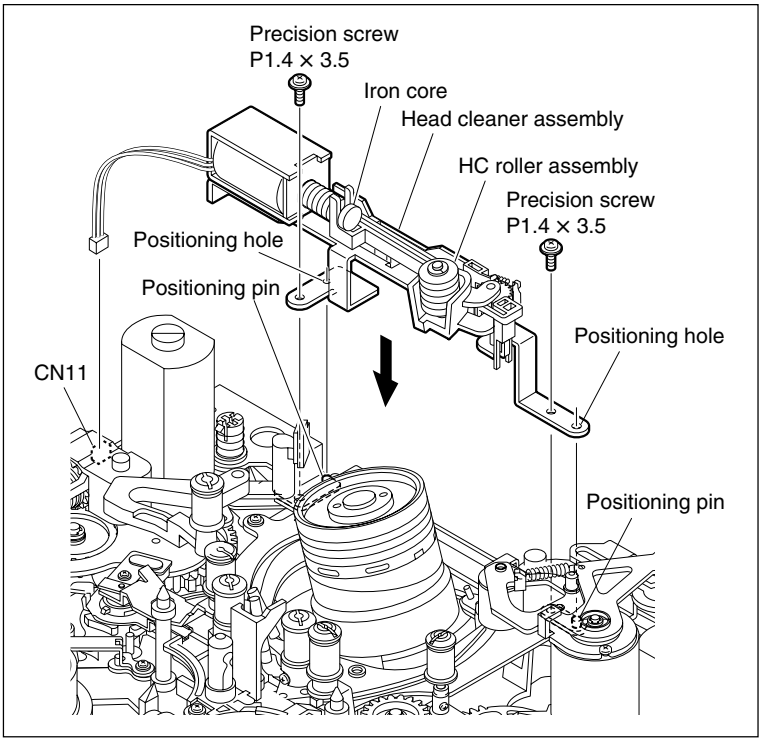
4. Reattaching the head cleaner assembly

(1) Align the positioning hole of the head cleaner assembly with the positioning pin on the MD chassis, and reattach it with the two precision screws.
Tightening Torque : 0.1 N•m {1 kgf•cm}

(2) Reconnect the harness to the connector (CN11) on the DR-428BG board.

Notes

- Use care not to contact the head cleaner assembly with the tape running surface on the drum.
- Do avoid touching the HC roller assembly with bave hands.



5. Connecting the connectors

(1) Connect the harnesses and flexible card wires to the two connectors (CN10, CN12) on the DR-428BG board of the back of the chassis.
(2) Connect the flexible card wire to the connector (CN102) on the RP-133 board.

6. Cleaning the heads and tape running surface

Clean the tape running surfaces of the drum and video heads with cleaning cloth moistened with cleaning fluid.

Adjustment after Replacement

7. Tape path adjustment

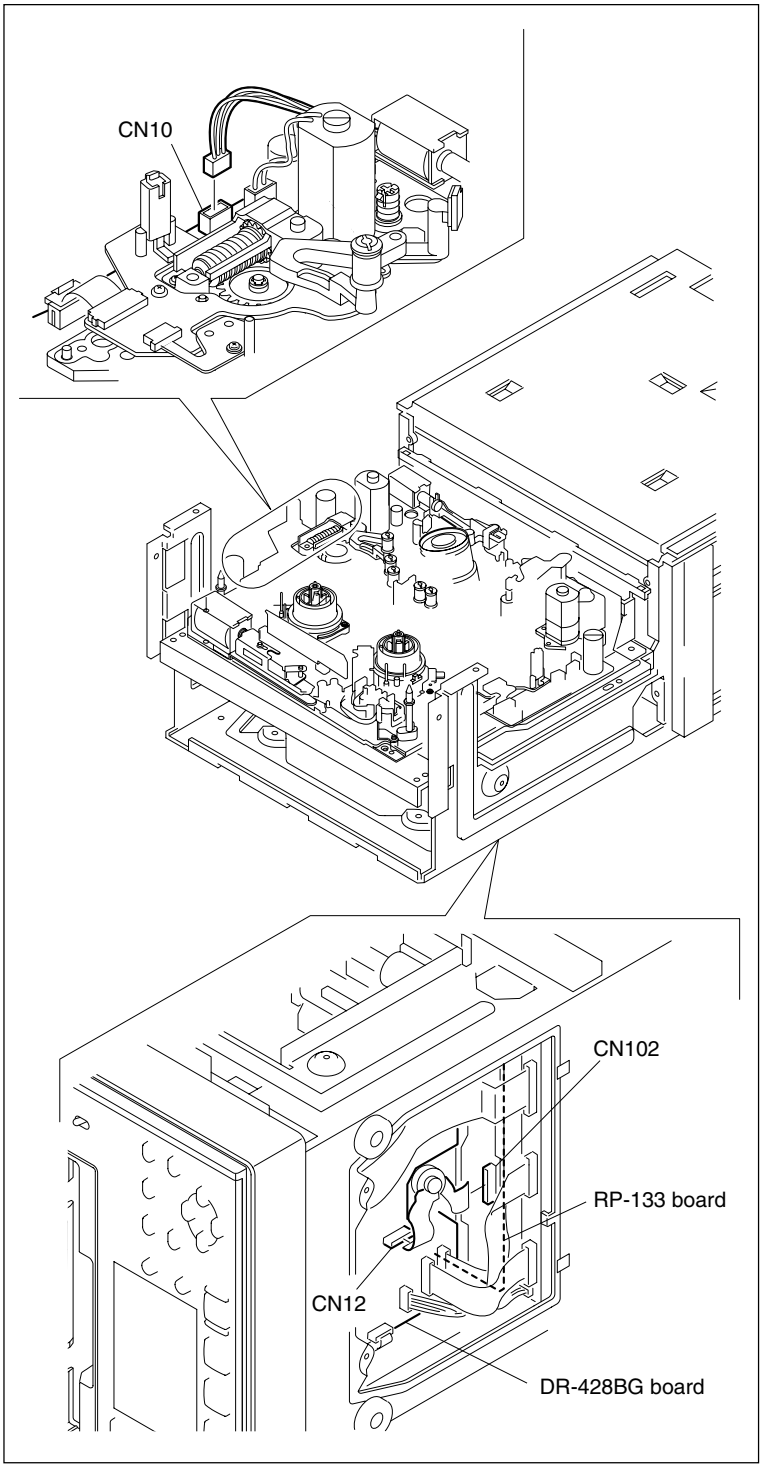
(Refer to Section 7-2.)

8. RF switching position adjustment

(Refer to Section 7-3.)

9. EQ adjustment

(Refer to Section 4-3-6.)



6-3. Brake Solenoid Replacement

Outline

Replacement

Disconnecting the connector
Removing the brake assembly
Replacing the brake solenoid
Reattaching the brake assembly
Reconnecting the connector
Checking the performance

Note

Prepare a new stop washer when replacing the brake solenoid.
Stop washer (1.5) : 3-669-465-01 × 1

Preparation

1. After setting the unit to the L cassette position, set it to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver's bit (for M2) : J-6325-380-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Tweezers

Replacement

1. Disconnecting the connector

Disconnect the harness from the connector (CN15) on the DR-428BG board located on the back side of the MD chassis with tweezers.

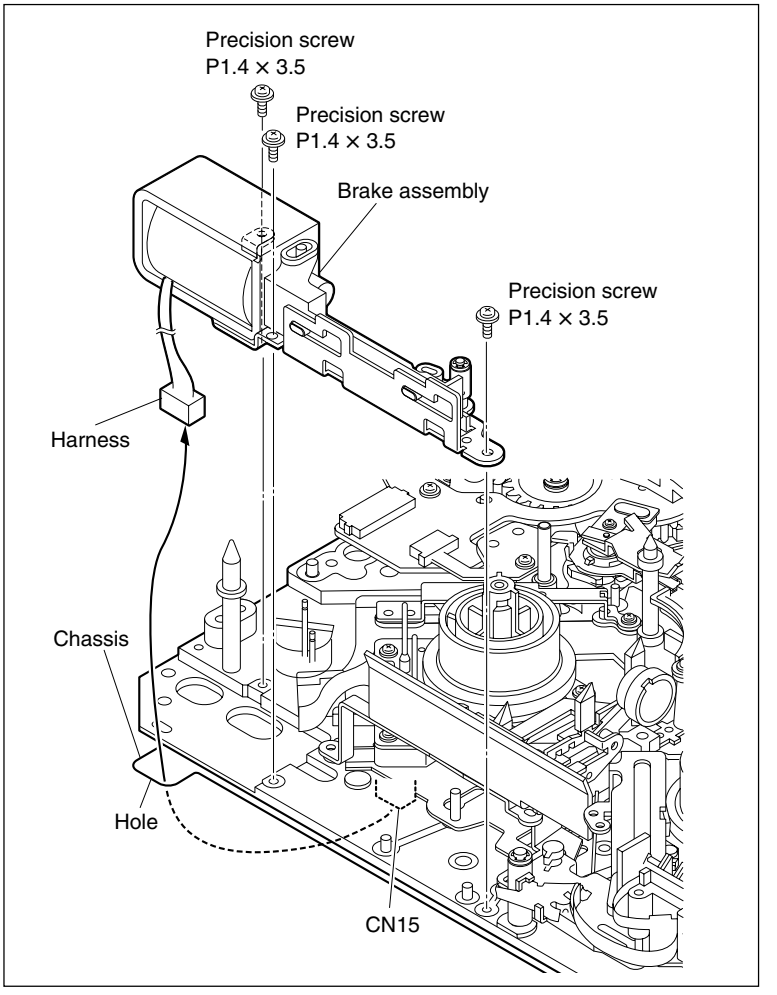
Note

Be careful not to suffer injury at hand by chassis during the disconnection.

2. Removing the brake assembly

(1) Remove the three precision screws securing the brake assembly.

(2) Pull out the harness of the solenoid from the square hole in the left side of the chassis with the brake assembly lifted up.

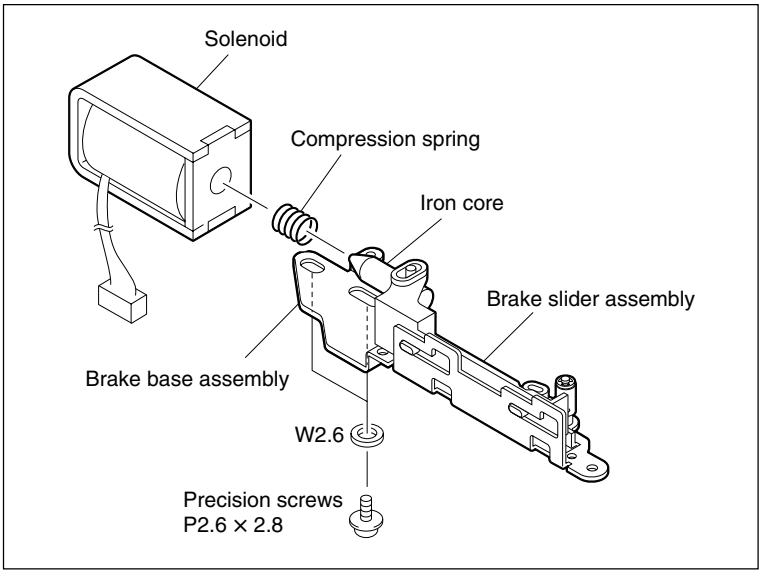


3. Replacing the brake solenoid

(1) Remove the two precision screws and remove the solenoid from the brake base assembly.

Note

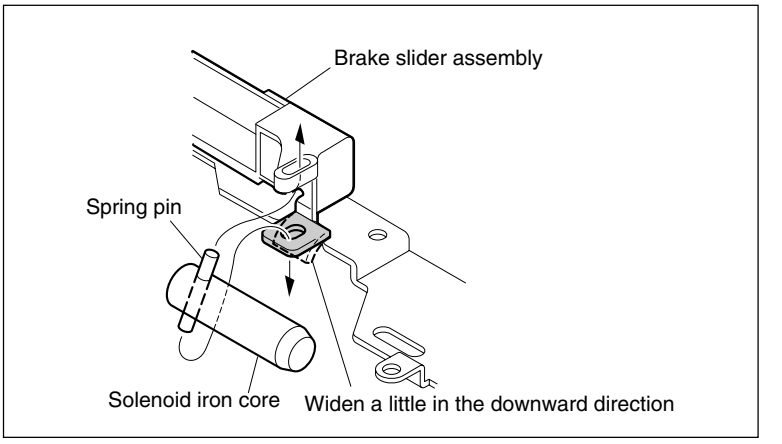
During this operation, the two washers come off together with the two screws, and further the compressed coil spring comes off from the iron core of the solenoid. Be careful not to lose them.



(2) Widen slightly the clearance shown in the brake slider assembly figure by a finger to remove the iron core of the solenoid.

Note

Applying an excessive force may cause deformation of the brake slider assembly.



(3) Reattach an iron core pin of a new solenoid to the brake slider assembly following the same step (2).

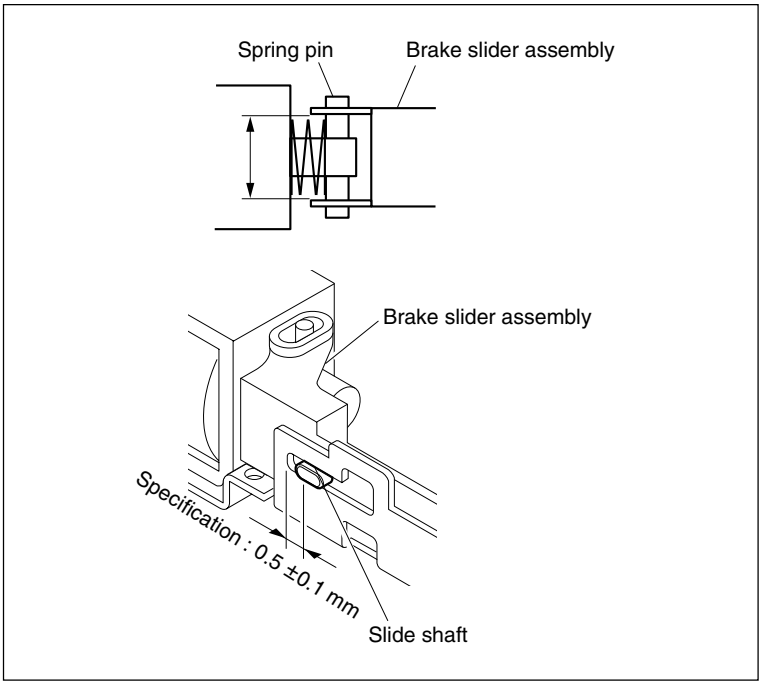
(4) After fitting the compressed coil spring removed in step (1) on the iron core, insert the iron core in a new solenoid.

(5) Fix temporally the solenoid positioning as shown in the figure to the brake base assembly with the two precision screws and two washers.

(6) Ensure that the compressed coil spring is placed between the upper and lower plates of the brake slider assembly (within the double headed arrow) as shown in the figure.

(7) Adjust the solenoid position to satisfy the specification of the clearance between the slide shaft and the slotted hole in the brake base assembly under the condition that the iron core is fully pulled in, and tighten securely the two precision screws.
Tightening Torque : 0.5 N•m {5 kgf•cm}

(8) Reattach the brake slider assembly to the brake base assembly with a new stop washer.



4. Reattaching the brake assembly

(1) Insert the harness of the brake assembly in a square hole on the left side of the chassis to bring it to the back side of the unit.

(2) Fit the slotted hole shown in the brake assembly figure on the pin on the brake release plate and further more fit the hole and slotted hole in the brake base assembly on the two reference pins of the MD chassis respectively, and fix it with the three precision screws.
Tightening Torque : 0.1 N•m {1 kgf•cm}

5. Reconnecting the connector

(1) Draw out the harness of the brake solenoid to bring it to the back side of the unit with tweezers.

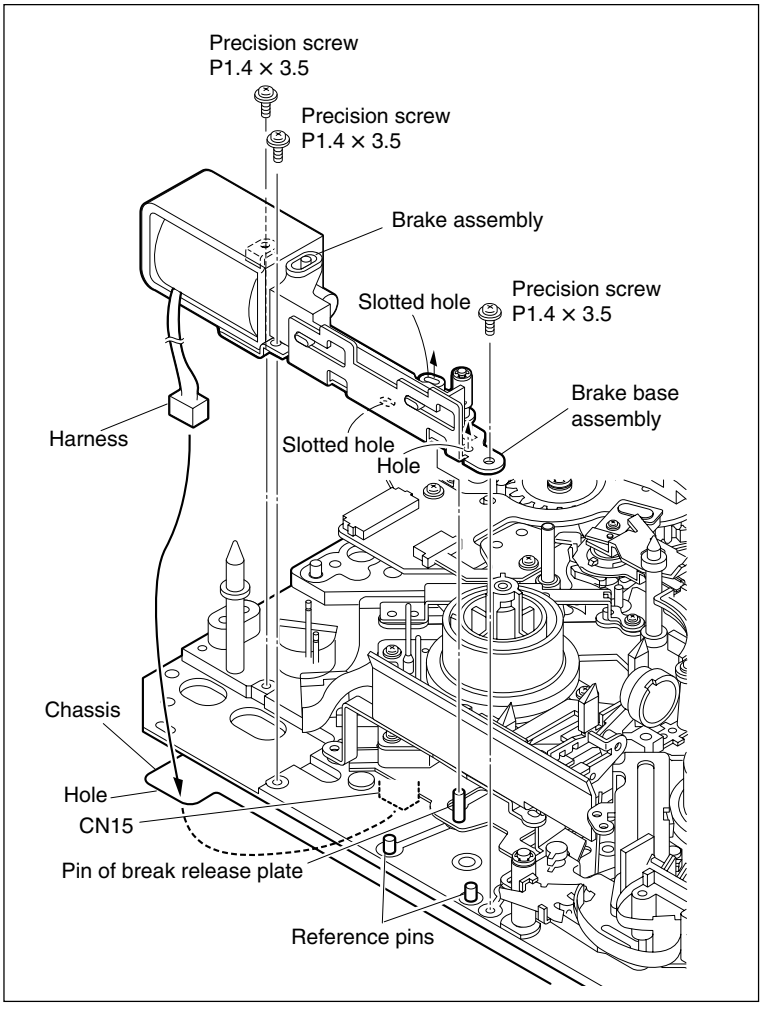
(2) Reconnect the harness to the connector (CN15) on the DR-428BG board.

6. Checking the performance

(1) Power on the unit and press the ⇦, MENU keys simultaneously to activate the maintenance menu.

(2) Following the pop-up menu in the maintenance menu, enter SERVO CHECK, PLUNGER CHECK, REEL BRAKE in order and select REEL BRAKE.

(3) Check that the brake solenoid ON/OFF switches smoothly by presing the ⇧, ⇩ keys.



6-4. Pinch Roller Replacement

Outline

Replacement

Removing the pinch limiter assembly.
Reattaching the pinch limiter assembly.

Adjustment after replacement

Checking the tape path adjustment

Note

- The pinch roller is a part of the pinch limiter assembly, therefore replace the pinch limiter assembly itself when the pinch roller needs to be replaced.
- Prepare a new stop washer when replacing the pinch roller assembly.
  Stop washer (1.5) : 3-669-465-01

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Grease (SG-941) : 7-662-001-39
- Tweezers

Replacement

1. Removing the pinch limiter assembly

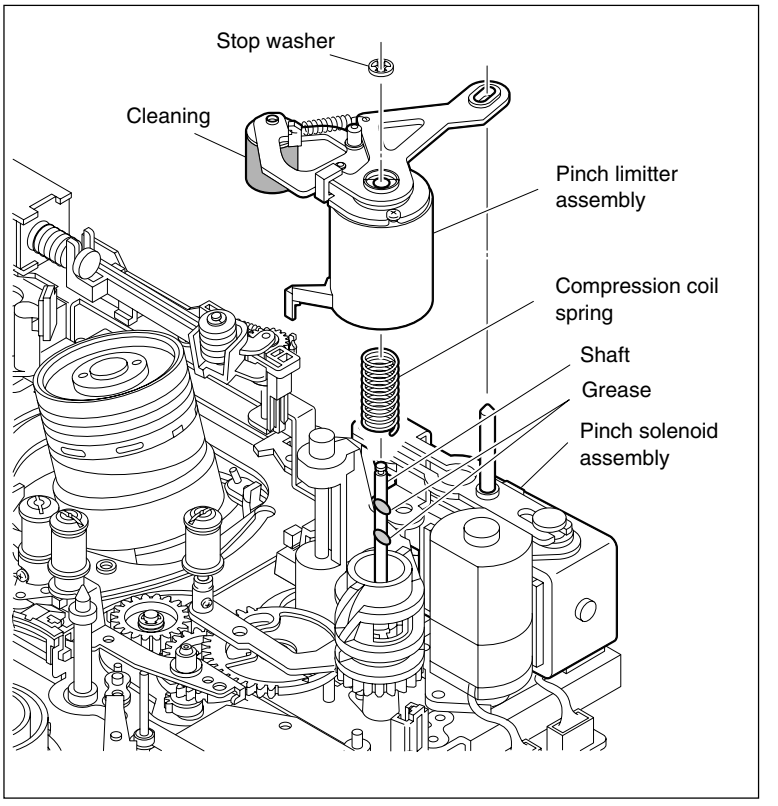
Remove the stop washer and remove the pinch limiter assembly.

Note

During this operation, if the compressed coil spring comes off together with the assembly, return the spring in place.

2. Reattaching the pinch limiter assembly

(1) Wipe a pinch roller in a new pinch limiter assembly with a cleaning cloth moistened with cleaning fluid.
(2) Wipe the shaft on the MD chassis with a cleaning cloth moistened with cleaning fluid.
(3) Apply grease about the quarter size of a tip of a cotton swab, to two portions of the shaft marked in the figure.
(4) Fit the hole in the pinch limiter assembly on the shaft on the MD chassis, while fitting the slotted hole in the pinch limiter assembly on the shaft on the pinch solenoid assembly, and fix it with a new stop washer (1.5).



Adjustment after Replacement

3. Checking the tape path adjustment

(Refer to Section 7-4.)

6-5. Elevator Cam Replacement

Outline

Replacement

Removing the pinch limiter assembly
Replacing the elevator cam
Reattaching the pinch limiter assembly

Adjustment after replacement

Chacking the tape path adjustment

Note

Prepare two kinds of new stop washers when replacing the elevator cam.
Stop washer (1.5) : 3-669-465-01 × 1 (for mounting the pinch limiter assembly)
Stop washer (2.3) : 3-669-596-01 × 1 (for mounting the elevator cam)

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Grease (SGL-941) : 7-662-001-39
- Tweezers

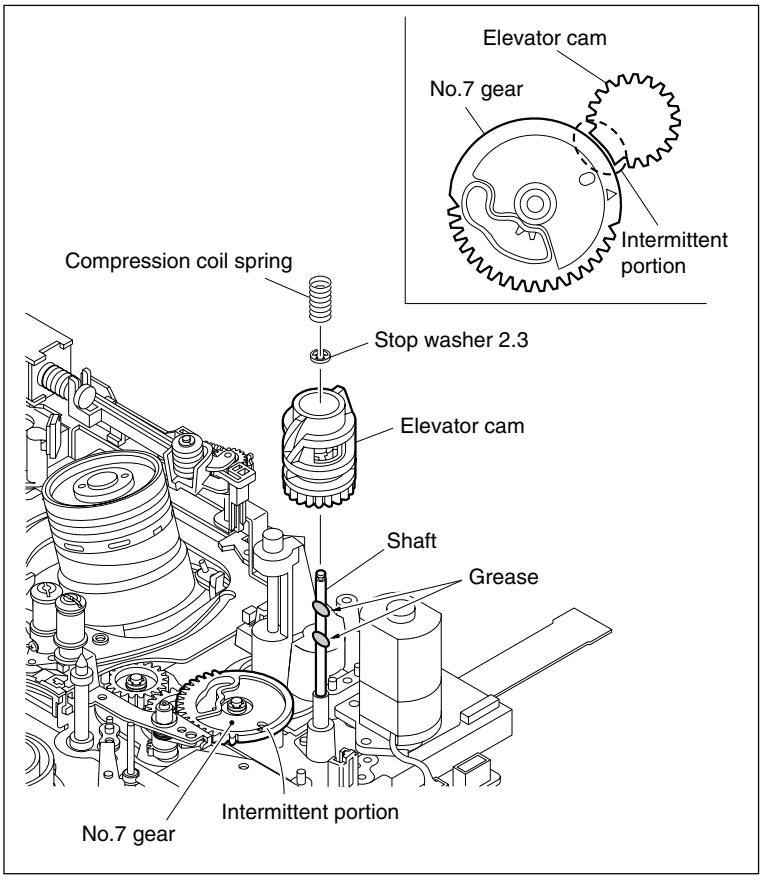
Replacement

1. Removing the pinch limiter assembly

Remove the pinch limiter assembly.
(Refer to Section 6-4.)

2. Replacing the elevator cam

(1) Lift off the compressed coil spring from the shaft on the MD chassis.
(2) Remove the stop washer and remove the elevator cam.
(3) Wipe the shaft on the MD chassis with a cleaning cloth moistened with cleaning fluid.
(4) Fit the elevator cam on the shaft on the chassis with the intermittent portion of the elevator cam joined to the intermittent portion of the No.7 gear as shown in the figure.
(5) Apply grease about the quarter size of a tip of a cotton swab, to two portions of the shaft shown in the figure.
(6) Reattach the elevator cam with a new stop washer (2.3).
(7) Fit the compressed coil spring on the shaft.



3. Reattaching the pinch limiter assembly

Reattach the pinch limiter assembly.
(Refer to Section 6-4.)

Adjustment after Replacement

4. Checking the tape path adjustment.

(Refer to Section 7-4.)

6-6. Pinch Solenoid Assembly Replacement

Outline

Replacement

Removing the pinch limiter assembly.
Disconnecting the connector.
Replacing the pinch solenoid assembly.
Reconnecting the connector.
Reattaching the pinch limiter assembly.

Adjustment after replacement

Checking the tape path adjustment

Note

Without removal/reattachment of the pinch limiter assembly, the pinch solenoid assembly cannot be replaced.
Therefore prepare a new stop washer for replacing the pinch limiter assembly.
Stop washer (1.5) : 3-669-465-01 × 1

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Tweezers

Replacement

1. Removing the pinch limiter assembly

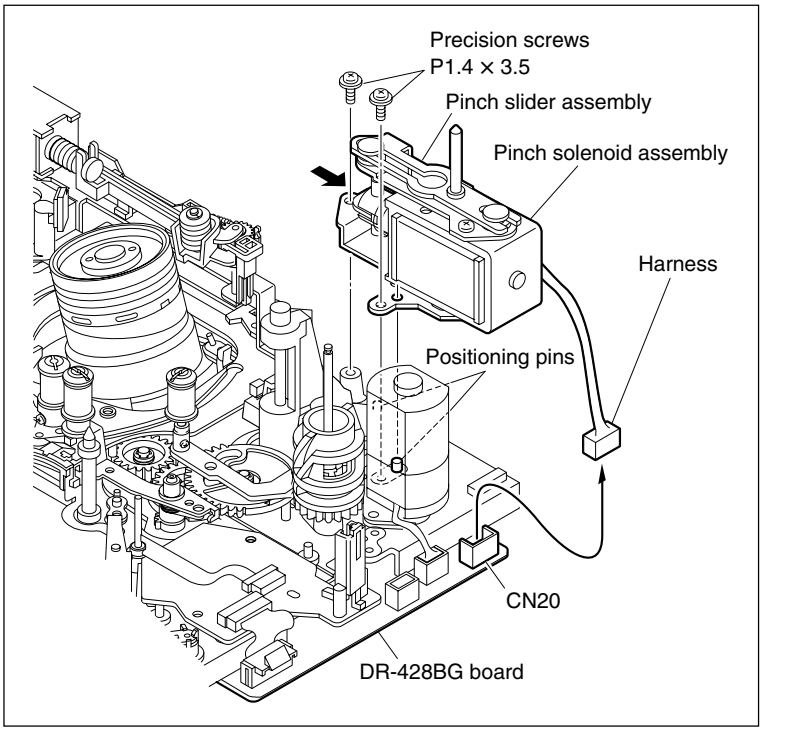
Remove the pinch limiter assembly.
(Refer to Section 6-4.)

2. Disconnecting the connectors

Disconnect the harness from the connector (CN20) on the DR-428BG board with tweezers.

3. Replacing the pinch solenoid assembly

(1) Remove the two precision screws with the pinch slider assembly drawn into the arrow direction and lift off the pinch solenoid assembly.
(2) Align two holes in a new pinch solenoid assembly with the two positioning pins on the MD chassis respectively.
(3) Reattach the pinch solenoid utilizing the two precision screws with the pinch slider assembly drawn in the arrow direction.
Tightening Torque : 0.1 N•m {1 kgf•cm}



4. Reconnecting the connector

Reconnect the harness to the connector (CN20) on the DR-428BG board with tweezers.

5. Reattaching the pinch limiter assembly

Reattach the pinch limiter assembly.
(Refer to Section 6-4.)

Adjustment after Replacement

6. Checking the tape path adjustment

(Refer to Section 7-4.)

6-7. Reel Motor (T) Assembly Replacement

Outline

Replacement

Disconnecting the connector
Moving the S/T reel tables
Removing the L push plate
Removing the MIC assembly
Removing the RMP (T1) retainer assembly
Replacing the reel motor (T) assembly
Reattaching the RMP (T1) retainer assembly
Reattaching the MIC assembly
Reattaching the L push plate
Reconnecting the connector
Checking the performance

Adjustment after replacement

T-REEL ONLY adjustment
TENSION adjustment
Tape path adjustment

Note

Without removal/reattachment of the MIC assembly, the reel motor (T) assembly cannot be replaced. Prepare a new stop washer when reattaching the MIC assembly.
Stop washer (1.5) : 3-669-465-01 × 1
Use care not to lose the polyethylene washer between the base plate and the MIC assembly.

Preparation

1. After setting the standard cassette position, set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

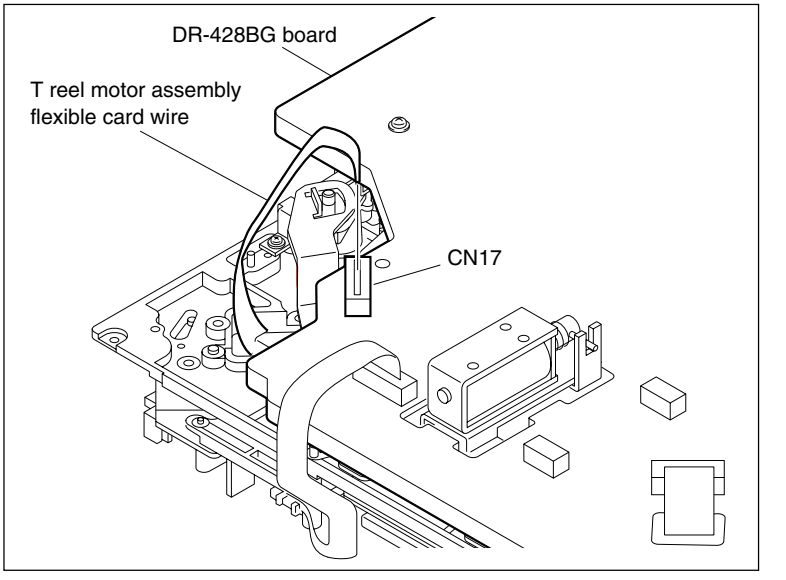
Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver's bit (for M2) : J-6325-380-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Replacement

1. Disconnecting the connector

Disconnect the flexible card wire from the connector (CN17) on the DR-428BG board located on the back side of the MD chassis.

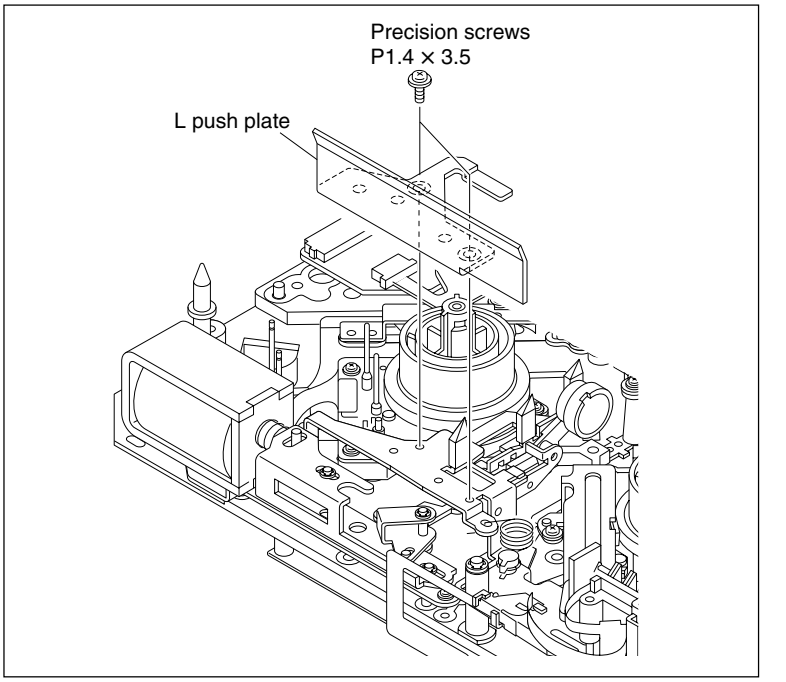


2. Moving the S/T reel tables

Turn the reel shift motor gear by a skewer and bring the S/T reel tables to the standard cassette position. (Refer to Section 6-18.)

3. Removing the L push plate

Remove the two precision screws to remove the L push plate.

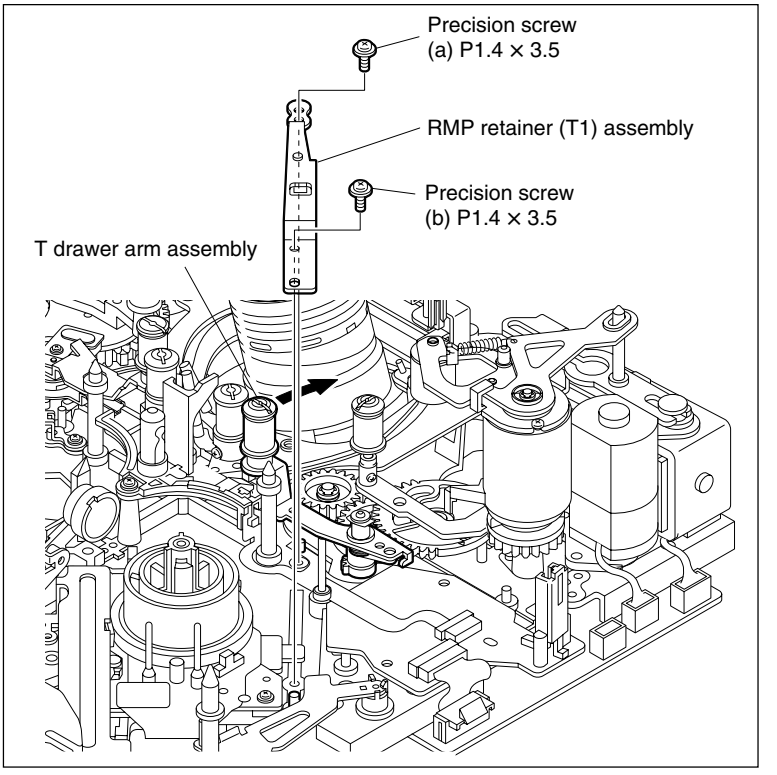


4. Removing the MIC assembly

Remove the MIC assembly.
(Refer to Section 6-18.)

5. Removing the RMP (T1) retainer assembly

(1) Remove the precision screw (a) with the T-drawer arm assembly drawn lightly in the arrow direction.
(2) Remove the precision screw (b) and remove the RMP (T1) retainer assembly.



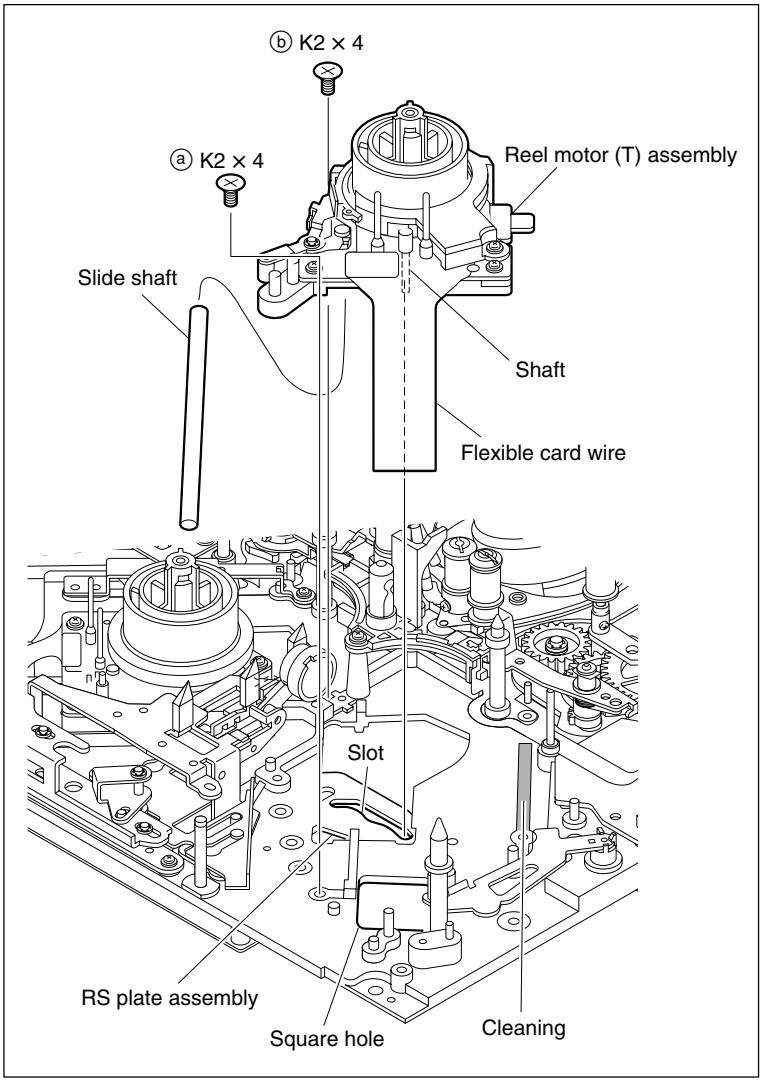
6. Replacing the reel motor (T) assembly

(1) Remove the two screws (ⓐ, ⓑ) securing the slide shaft and remove the reel motor (T) assembly.
(2) Extract the slide shaft from the reel motor (T) assembly.
(3) Wipe the shaded portion in the figure with a cleaning cloth moistened with cleaning fluid.
(4) Apply grease about the quarter size of a tip of a cotton swab, to the center of the shaded portion.
(5) Wipe the slide shaft with dry cloth such as gauze, and then insert it in a hole of a new reel motor T assembly.

Note

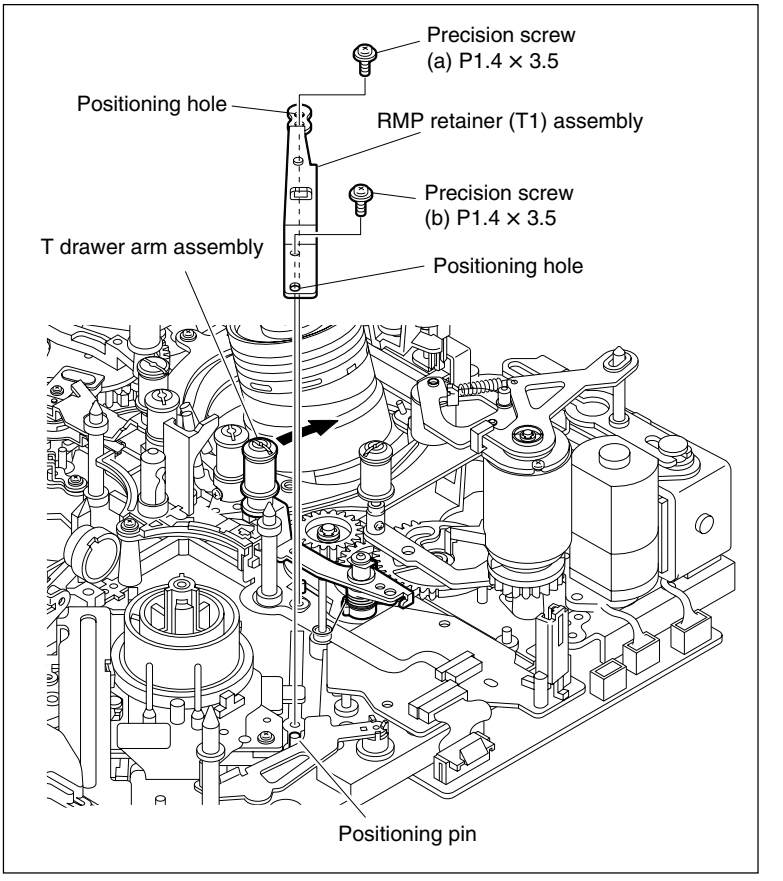
Use extreme care not to scratch the shaft and hole during extracting and inserting operation.

(6) Insert a shaft located on the back side of the reel motor (T) assembly in the slot in the RS plate assembly.
(7) Insert the flexible card wire in the square hole in the MD chassis.
(8) Tighten the screw ⓐ and next ⓑ to reattach the slide shaft.
Tightening Torque : 0.1 N•m {1 kgf•cm}



7. Reattaching the RMP (T1) retainer assembly

(1) Fit the two positioning holes in the RMP (T1) retainer assembly on the two positioning pins on the MD chassis.
(2) Tighten the two precision screws to fix the RMP (T1) retainer assembly while drawing lightly the T drawer arm assembly in the arrow direction.



8. Reattaching the MIC assembly

Reattach the MIC assembly.
(Refer to Section 6-18.)

9. Reattaching the L push plate

Reattach the L-push plate with the two precision screws with the two holes in the L push plate aligned with the two protrusions on the RLR assembly.
Tightening Torque : 0.1 N•m {1 kgf•cm}

10. Reconnecting the connector

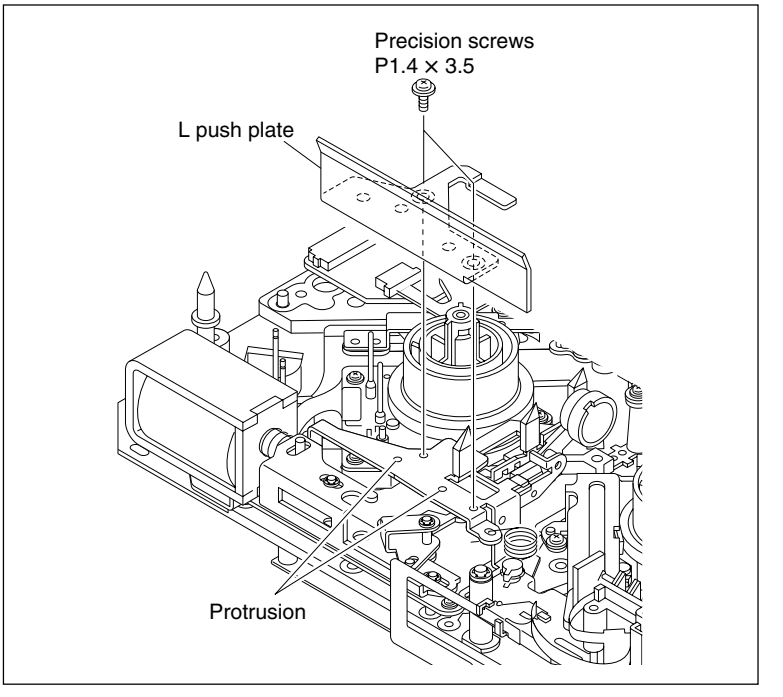
Reconnect the flexible card wire to the connector (CN17) on the DR-428BG board located on the back side of the MD chassis.

Notes

- Be careful not to insert the flexible card wire obliquely.
- Do insert the flexible card wire straight and securely as far as it will go.
- Take care not to fold the flexible card wire. This shortens the life of the flexible card wire.

11. Checking the performance

Check the S/T reel tables move smoothly by turning the reel shift motor gear by a skewer.



Adjustment after Replacement

12. T-REEL ONLY adjustment

(Refer to Section 4-3-4.)

13. TENSION adjustment

(Refer to Section 4-3-4.)

14. Tape path adjustment

(Refer to Section 7-2.)

6-8. Reel Motor (S) Assembly Replacement

Outline

Replacement

Disconnecting the connector
Moving the S/T reel tables
Removing the RMP (S1) retainer assembly
Replacing the reel motor (S) assembly
Reattaching the RMP (S1) retainer assembly
Reconnecting the connector
Checking the performance

Adjustment after replacement

S-RELL ONLY adjustment
TENSION adjustment
Tape path adjustment

Preparation

1. After setting the unit to the standard cassette position, set it to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver's bit (for M2) : J-6325-380-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

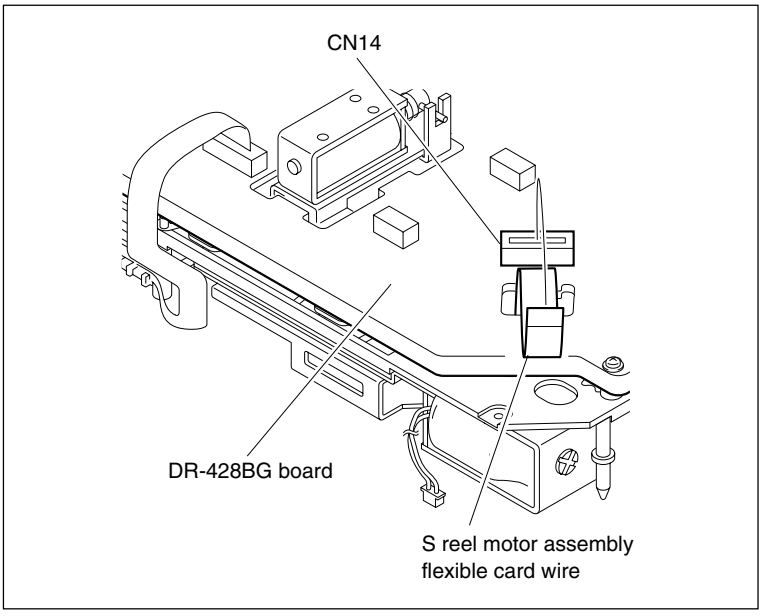
Replacement

1. Disconnecting the connector

Disconnect the flexible card wire from the connector (CN14) on the DR-428BG board located on the back side of the MD chassis.

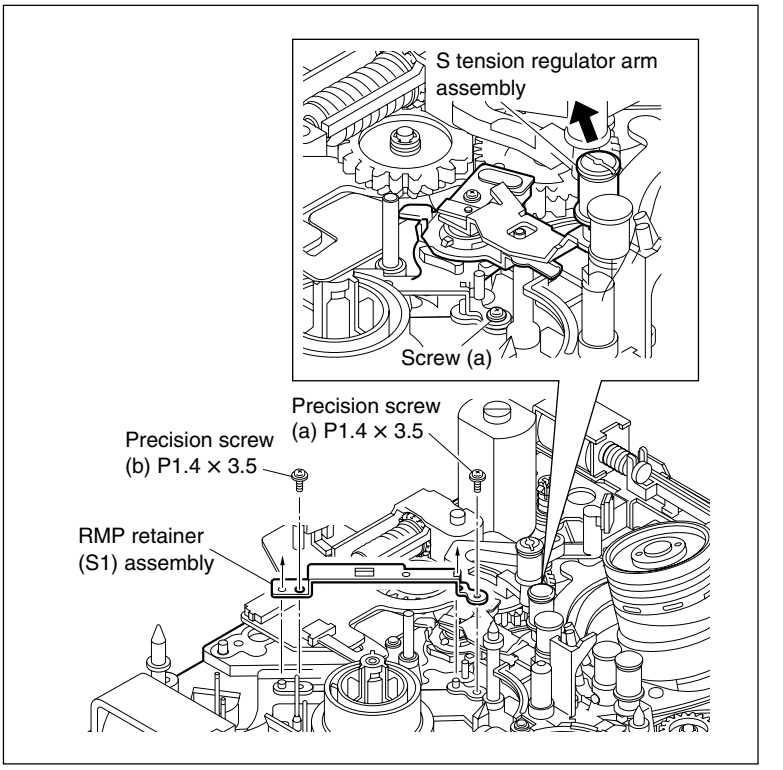
2. Moving the S/T reel tables

Turn the reel shift motor gear by a skewer and bring the S/T reel tables to the standard cassette position. (Refer to Section 6-18.)



3. Removing the RMP (S1) retainer assembly

(1) Remove the precision screw (a) with the S tension regulator arm assembly drawn lightly in the arrow direction.
(2) Remove the precision screw (b), then remove the RMP (S1) retainer assembly.



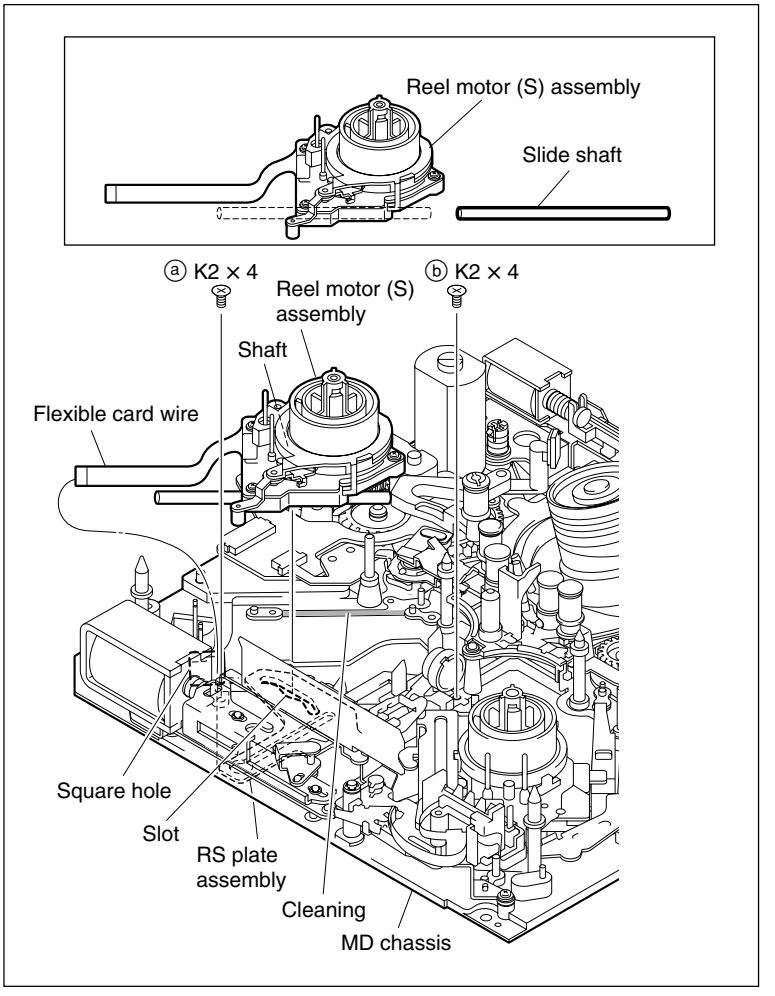
4. Replacing the reel motor (S) assembly

(1) Remove the two screws (ⓐ, ⓑ) securing the slide shaft and remove the reel motor (S) assembly.
(2) Extract the slide shaft from the reel motor (S) assembly.
(3) Wipe the shaded portion in the figure with a cleaning cloth moistened with cleaning fluid.
(4) Apply grease about the quarter size of a tip of a cotton swab, to the center of the shaded portion.
(5) Wipe the slide shaft with dry cloth such as gauze, and then insert it in a hole of a new reel motor S assembly.

Note

Use extreme care not to scratch the shaft and hole during extracting and inserting operation.

(6) Insert a shaft located on the back side of the reel motor (S) assembly in the slot in the RS plate assembly.
(7) Insert the flexible card wire in the square hole in the MD chassis.
(8) Tighten the screw ⓐ and next ⓑ to reattach the slide shaft.
Tightening Torque : 0.1 N•m {1 kgf•cm}



5. Reattaching the RMP (S1) retainer assembly

(1) Fit the two positioning holes in the RMP (S1) retainer assembly on the two positioning pins on the MD chassis.

(2) Tighten the two precision screws to fix the RMP (S1) retainer assembly while drawing lightly the S tension regulator arm assembly in the arrow direction.

6. Reconnecting the connector

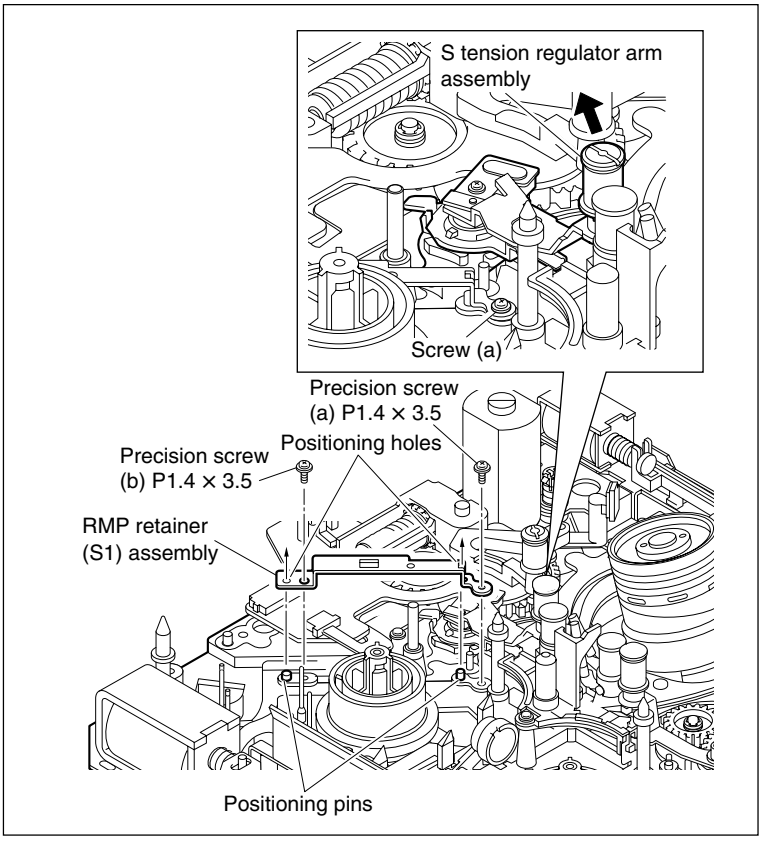
Reconnect the flexible card wire to the connector (CN14) on the DR-428BG board located on the back side of the MD chassis.

Notes

- Be careful not to insert the flexible card wire obliquely.
- Do insert the flexible card wire straight and securely as far as it will go.
- Take care not to fold the flexible card wire. This shortens the life of the flexible card wire.

7. Checking the performance

Check the S/T reel tables move smoothly by turning the reel shift motor gear by a skewer.



Adjustment after Replacement

8. S-REEL ONLY alignment

(Refer to Section 4-3-4.)

9. TENSION alignment

(Refer to Section 4-3-4.)

10. Tape path adjustment

(Refer to Section 7-2.)

6-9. M Stop Solenoid Replacement

Outline

Replacement

Removing the M stop drive plate assembly
Replacing the M stop solenoid
Installing the M stop drive plate assembly

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the bottom plate assembly. (Refer to Section 2-7-2.)
4. Remove the DR-428BG board. (Refer to Section 6-26-5.)

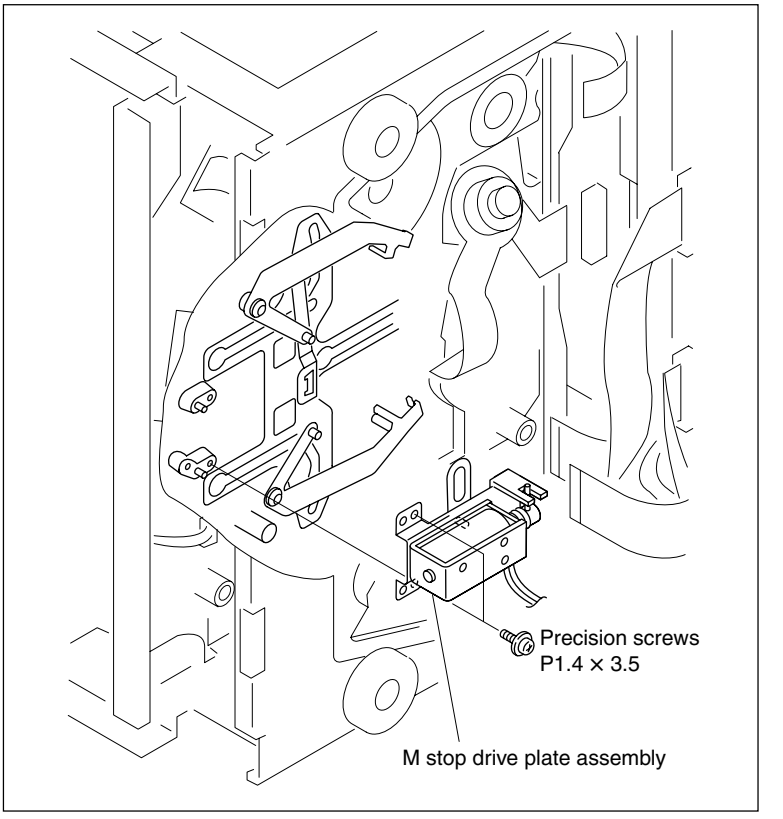
Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver bit (for M2) : J-6325-380-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Locking compound (Three bond-1401B) : 7-432-114-11

Replacement

1. Removing the M stop drive plate assembly

Remove the two precision screws then remove the M stop drive plate assembly.



2. Replacing the M stop solenoid

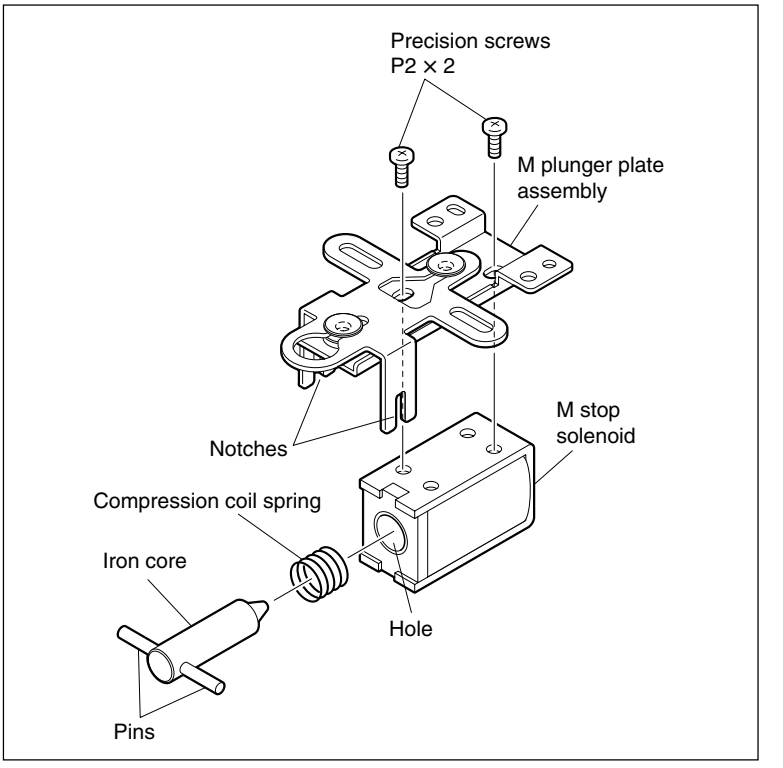
(1) Remove the two precision screws then remove the M plunger plate assembly.

Note

Be careful not to lose the iron core and the compression coil spring because they drop when the M plunger plate assembly is removed.

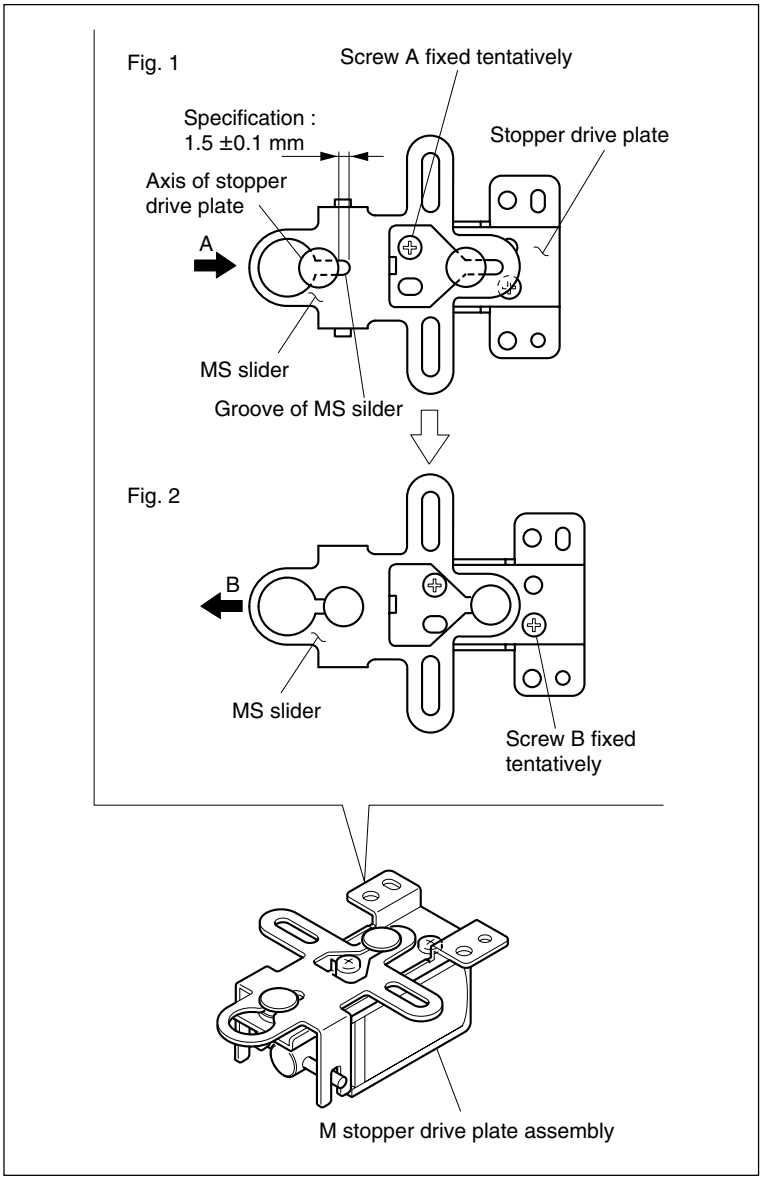
(2) Install the compression coil spring to the iron core and insert it into the hole of the new M stop solenoid.

(3) Insert the pin of the iron core pin into the two notches of the M plunger plate assembly and fix it tentatively with the two precision screws.



(4) While the MS slider is kept slid in the direction of the arrow, adjust the stopper drive plate position so that the distance between the groove of the MS slider and the axis of the stopper drive plate satisfies the specification. Then, tighten the screw A that has been fixed tentatively in step (3). (Fig. 1)

(5) Slide the MS slider in the direction of the arrow and tighten the screw B that has been fixed tentatively in step (3). (Fig. 2)
After tightening the screw, apply the locking compound to the two screws.
Tightening torque : 0.2 N•m {2 kgf•cm}
Specification : 1.5 ±0.1 mm

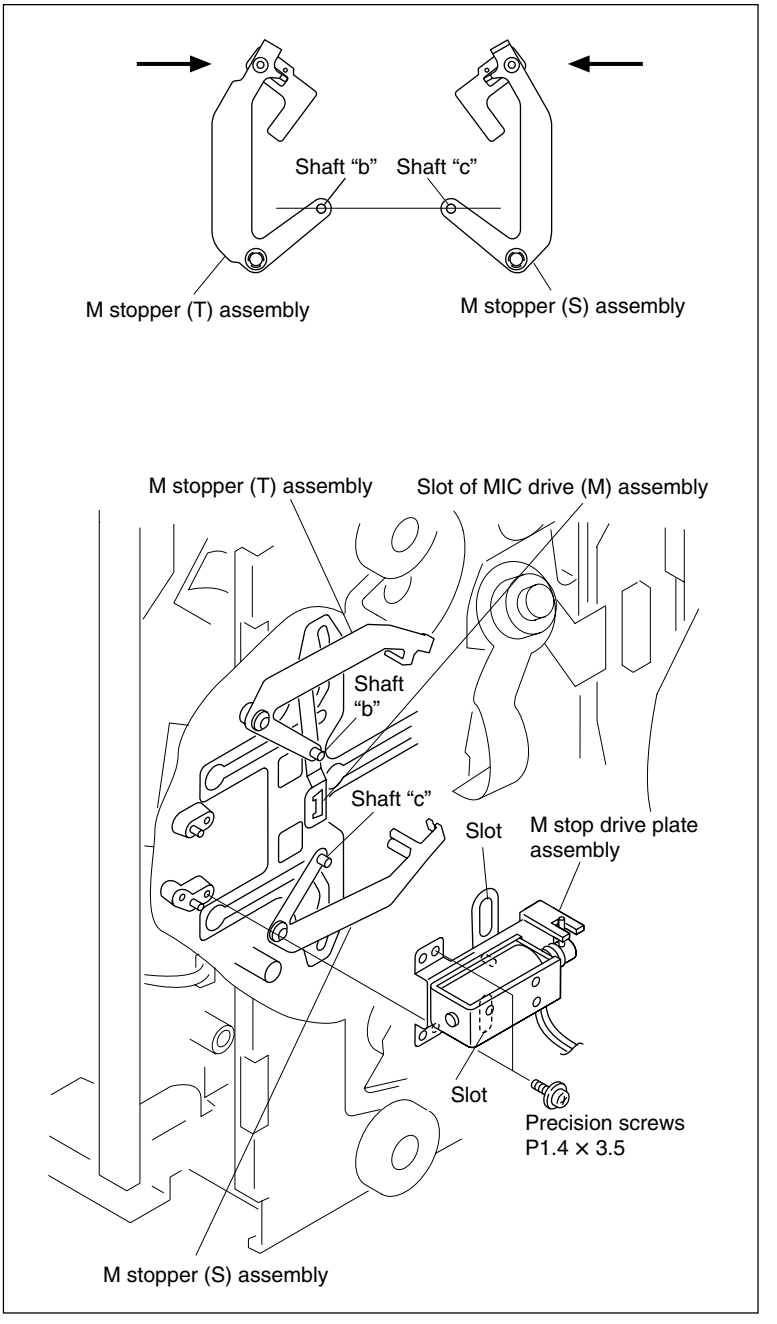


3. Installing the M stop drive plate assembly

(1) Move the shaft “b” of the M stopper (T) assembly and the shaft “c” of the M stopper (S) assembly with fingers in the direction toward the drum.

(2) Insert the shaft that is located in the back of the M stop drive plate assembly into the slot of the MIC drive (M) assembly. At the same time, insert the shafts of both the M stopper (T) assembly and the M stopper (S) assembly into the two slots of the M stop drive plate assembly as shown in the illustration. Fix them with the two precision screws to the MD chassis.
Tightening torque : 0.1 N•m {1 kgf•cm}

(3) Check to see that all of the M stopper (T) assembly, the M stopper (S) assembly and the MIC drive (M) assembly move smoothly when the iron core of the solenoid is moved in the direction of energizing (pulled in).



6-10. S Tension Regulator Assembly Replacement

Outline

Replacement

Removing the TG1 arm assembly
Removing the loading motor assembly
Removing the SE-521G board
Replacing the S tension regulator assembly
Reattaching the SE-521G board
Reattaching the loading motor assembly
Reattaching the TG1 arm assembly
Cleaning the tape guide

Adjustment after replacement

TENSION adjustment
Tape path adjustment

Notes

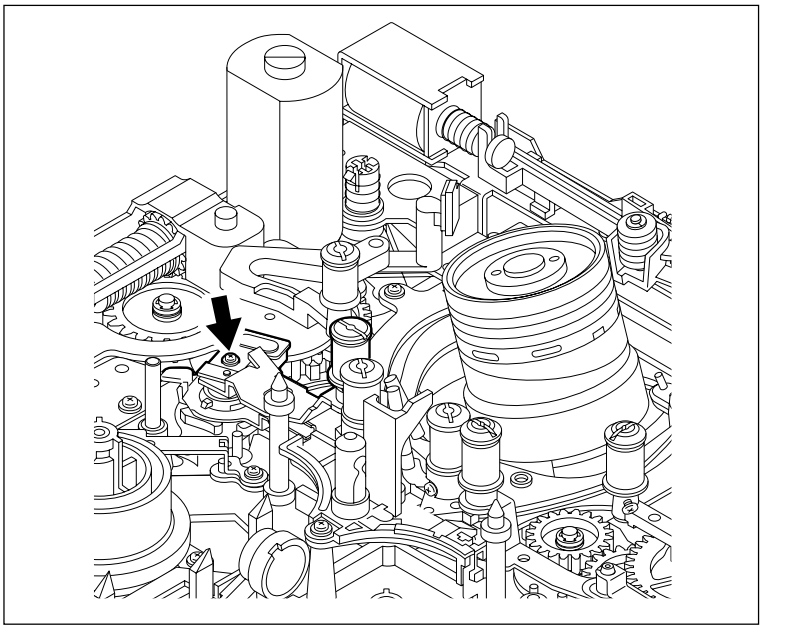
Use extreme care not to scratch the drum when replacing the S tension regulator assembly.
Never loosen the screw shown in the figure. If the screw is loosened, replace the S tension regulator with a new one.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

- Torque driver's bit (for M1.4) : J-6325-110-A
- Torque driver (for 3 kgf•cm) : J-6325-400-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Tweezers



Replacement

1. Removing the TG1 arm assembly

Remove the TG1 arm assembly.
(Refer to Section 6-12.)

2. Removing the loading motor assembly

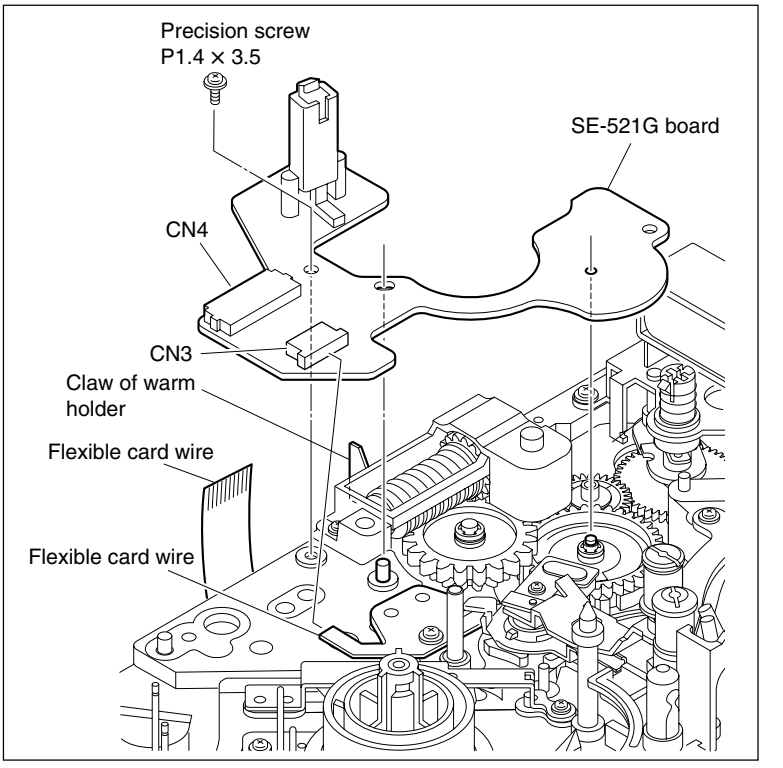
Remove the loading motor assembly.
(Refer to Section 6-16.)

3. Removing the SE-521G board

(1) Disconnect the flexible card wire from the connector (CN3) on the SE-521G board.
(2) Disconnect the flexible card wire from the connector (CN4) on the SE-521G board.
(3) Remove the precision screw and remove the SE-521G board.

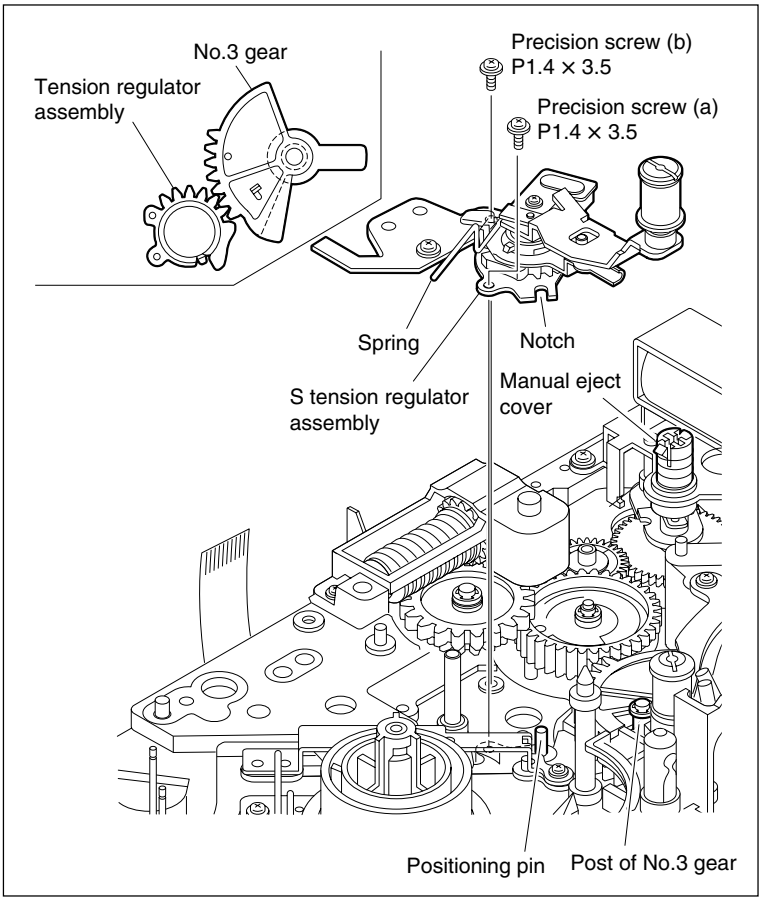
Note

Use care about the claw of the worm holder.



4. Replacing the S tension regulator assembly

(1) Remove the S tension regulator assembly by removing the two precision screws.
(2) Turn the manual eject cover clockwise until No.3 gear comes to the position shown in the figure.
(3) Engage a gear on a new S tension regulator assembly with No.3 gear as shown in the figure, and align the notch of the S tension regulator with the positioning pin on the chassis, then attach the new assembly to the chassis with the precision screw (a).
(4) Turn the manual eject cover counterclockwise to bring to the unthreading end position.
(5) Reattach the S tension regulator assembly to the MD chassis with the precision screw (b).
Tightening Torque : 0.1 N•m {1 kgf•cm}
(6) Turn the manual eject cover clockwise to enter the threading condition. At this operation, check the two points below.
The spring of the S tension regulator assembly shown in the figure do not contact the post of No.3 gear.
The column pushes the spring under unthreading end status.
Unless satisfy these conditions, perform the step (2) and after.
(7) Turn the manual eject cover counterclockwise to bring to the unthreading end position.



5. Reattaching the SE-521G board

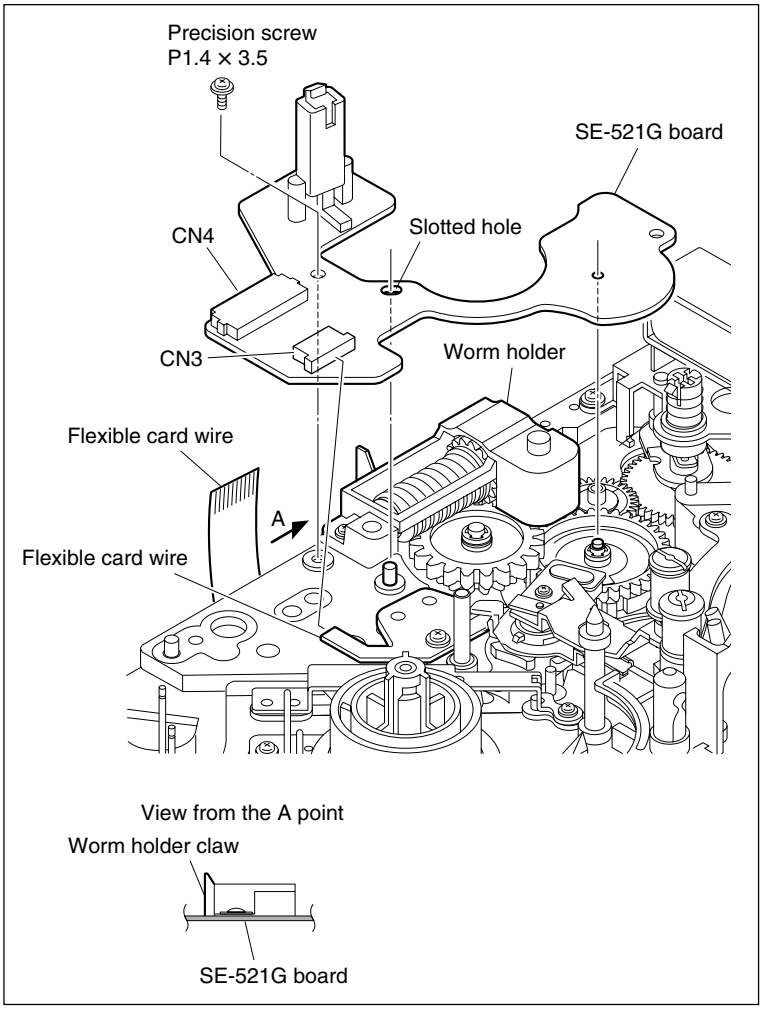
(1) Fit the hole and slotted hole on the SE-521G board on the two shafts on the MD chassis respectively and fix it with the precision screw.

Notes

- At this operation, be careful not to pinch the tip of the flexible card wire of the S tension regulator assembly between the SE-521G board and the chassis.
- Insert the SE-521G board under the claw of the worm holder.

(2) Reconnect the flexible card wire to the connector (CN4) on the SE-521G board.

(3) Reconnect the flexible card wire of the S tension regulator assembly to the connector (CN3) on the SE-521G board.



6. Reattaching the loading motor assembly

Reattach the loading motor assembly.
(Refer to Section 6-16.)

7. Reattaching the TG1 arm assembly

Reattach the TG1 arm assembly.
(Refer to Section 6-12.)

8. Cleaning the tape guide

Wipe the tape guides of the S tension regulator and the TG1 arm assemblies with a cleaning cloth moistened with cleaning fluid.

Adjustment after Replacement

9. TENSION adjustment

(Refer to Section 4-3-4.)

10. Tape path adjustment

(Refer to Section 7-2.)

6-11. T Drawer Arm Assembly Replacement

Outline

Replacement

Removing the T drawer arm assembly
Checking the mounting position of the T gear
Reattaching the T drawer arm assembly
Cleaning the tape guide

Adjustment after replacement

Checking the tape path adjustment

Note

Use extreme care no to scratch the drum when replacing the T drawer arm assembly.

Preparation

1. Let the unit into the unthreading position.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Tweezers

Replacement

1. Removing the T drawer arm assembly

(1) Remove the stop washer from the shaft on the MD chassis and remove the T drawer arm assembly.
(2) Remove the portion "a" of the T spring shown in the figure from the notch in the T drawer arm assembly with tweezers.
(3) Remove the T drawer arm assembly.

2. Checking the mounting position of the T gear

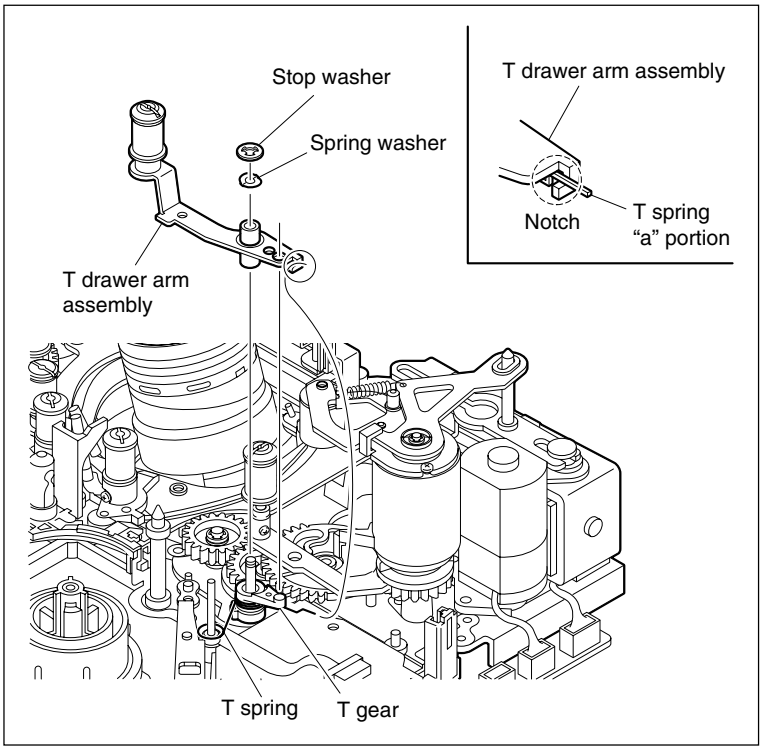
Check that the engagement between the T gear and No. 6 gear is in the position shown in the figure.

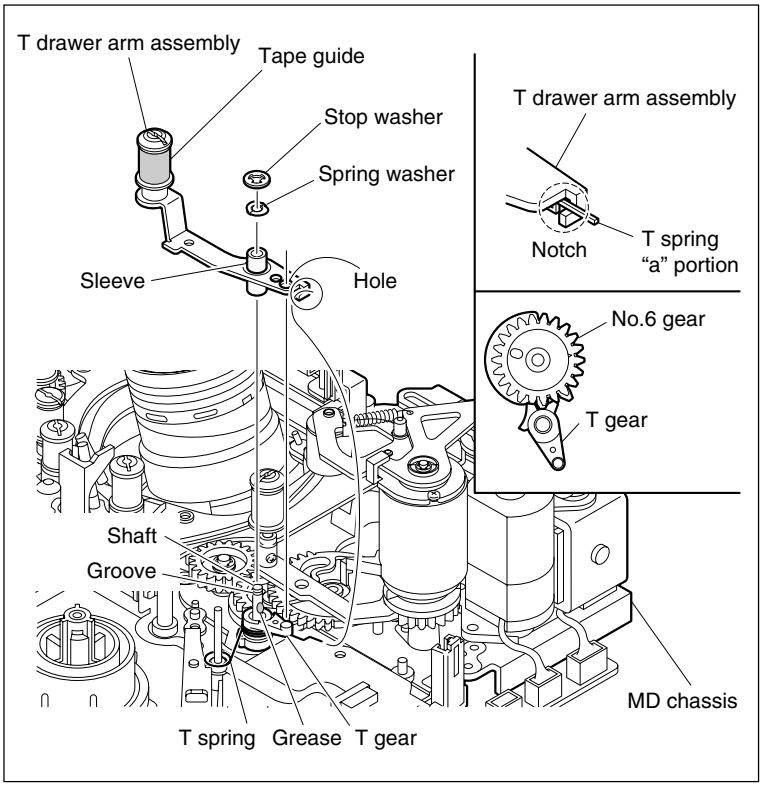
3. Reattaching the T drawer arm assembly

(1) Apply grease of 1/3 size of a rice grain to the shaft on the MD chassis.
(2) Fit a new T drawer arm assembly on the shaft and fit the hole in the T drawer arm assembly on the protrusion on the T gear.
(3) Hook again the portion "a" of the T spring unhooked in step 1- (2) on the notch in the T drawer arm assembly with tweezers.
(4) Fit the spring washer on the shaft on the MD chassis and fix it with the stop washer.

4. Cleaning the tape guide

Wipe the tape guide on the T drawer arm assembly with a cleaning cloth moistened with cleaning fluid.





Adjustment after Cleaning

5. Checking the tape path adjustment

(Refer to Section 7-4.)

6-12. TG1 Arm Assembly Replacement

Outline

Replacement

Replacing the TG1 arm assembly
Cleaning the tape guide

Adjustment after replacement

TENSION adjustment
Checking the tape path adjustment

Note

Do avoid touching with bare hands to the tape cleaner a part of in TG1 arm assembly. Sharpness of the edge on the tape cleaner may cause a hand cut, therefore use extreme care when replacing the TG1 arm assembly.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

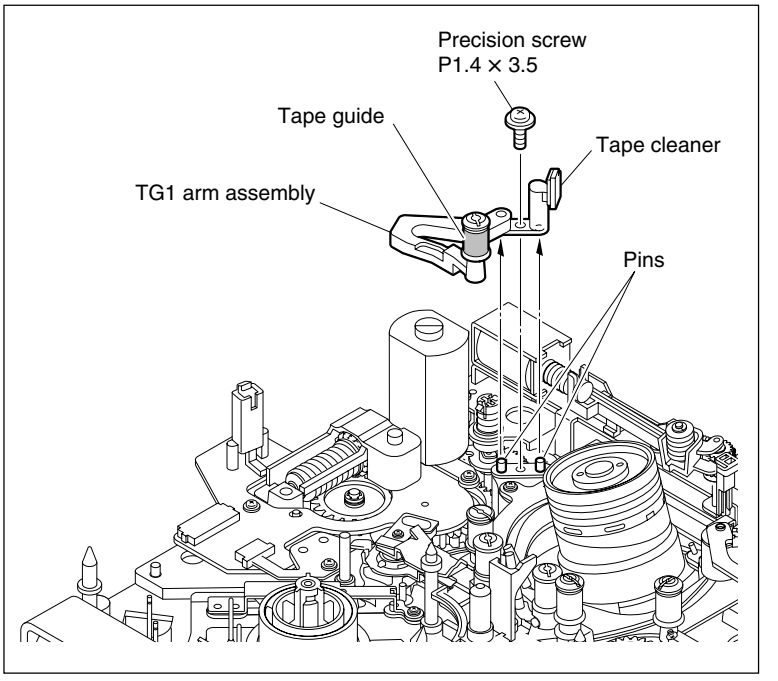
- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Replacement

1. Replacing the TG1 arm assembly

(1) Remove the precision screw and remove the TG1 arm assembly from the MD chassis.

(2) Fit two holes in a new TG1 arm assembly on the two pins on the MD chassis respectively and fix the assembly with the precision screw.
Tightening Torque : 0.1 N•m {1 kgf•cm}



2. Cleaning the tape guide

Wipe the tape guide on the TG1 arm assembly with a cleaning cloth moistened with cleaning fluid.

Adjustment after Replacement

3. TENSION adjustment

(Refer to Section 4-3-4.)

4. Checking the tape path adjustment

(Refer to Section 7-4.)

6-13. TG8 Arm Assembly Replacement

Outline

Replacement

Replacing the TG8 arm assembly
Cleaning the tape guide

Adjustment after replacement

Checking the tape path adjustment

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

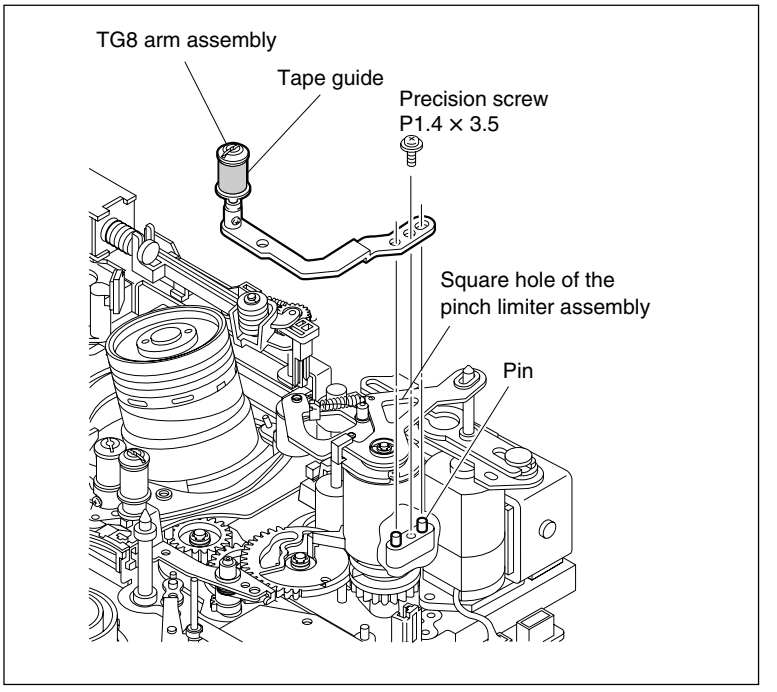
- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Tweezers

Replacement

1. Replacing the TG8 arm assembly

(1) Insert a torque screwdriver through the square hole of the pinch limiter assembly to access the screw securing TG8 arm assembly. Remove the precision screw to remove the TG8 arm assembly.

(2) Fit a hole and a slotted hole in a new TG8 arm assembly on the two pins on the MD chassis and fix it with the precision screw.
Tightening Torque : 0.1 N•m {1 kgf•cm}



2. Cleaning the tape guide

Wipe the tape guide on the TG8 arm assembly with a cleaning cloth moistened with cleaning fluid.

Adjustment after Replacement

3. Adjustment after replacement

Checking the tape path adjustment
(Refer to Section 7-4.)

6-14. Rail Assembly Replacement

Outline

Replacement

Moving the S/T reel tables
Removing the S tension regulator assembly
Removing the T drawer arm assembly
Removing the RMP retainer (T1) assembly
Removing the head cleaner assembly
Removing the rail assembly
Reattaching the rail assembly
Reattaching the head cleaner assembly
Reattaching the RMP retainer (T1) assembly
Reattaching the T drawer arm assembly
Reattaching the S tension regulator assembly
Checking the threading/unthreading performance
Cleaning the tape guide

Adjustment after replacement

TENSION adjustment
Tape path adjustment

Note

Use extreme care not to scratch the drum and the tape guide when replacing the rail assembly.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Tweezers

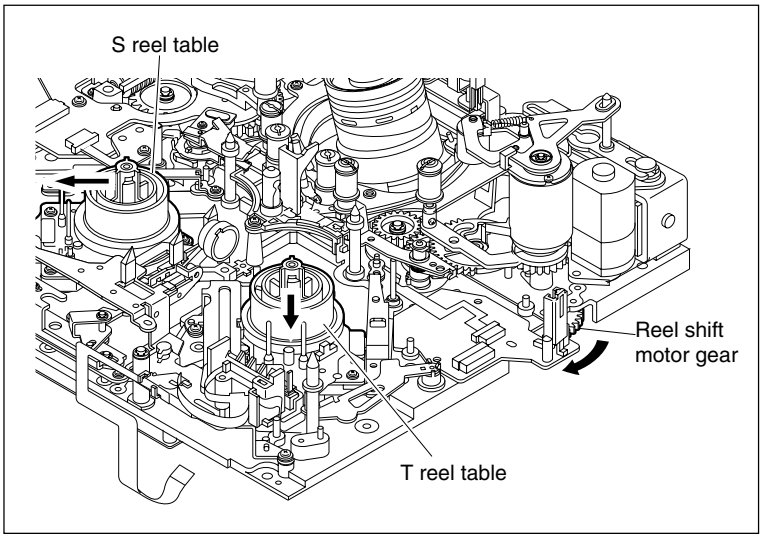
Replacement

1. Moving the S/T reel tables

Bring the S/T reel tables to the L cassette position (the most front side) by turning the reel shift motor gear in the arrow direction by a skewer.

Note

This provides easy operation of succeeding tasks.



2. Removing the S tension regulator assembly

Remove the S tension regulator assembly.
(Refer to Section 6-10.)

3. Removing the T drawer arm assembly

Remove the T drawer arm assembly.
(Refer to Section 6-11.)

4. Removing the RMP retainer (T1) assembly

Remove the two screws and remove the RMP retainer (T1) assembly.

5. Removing the head cleaner

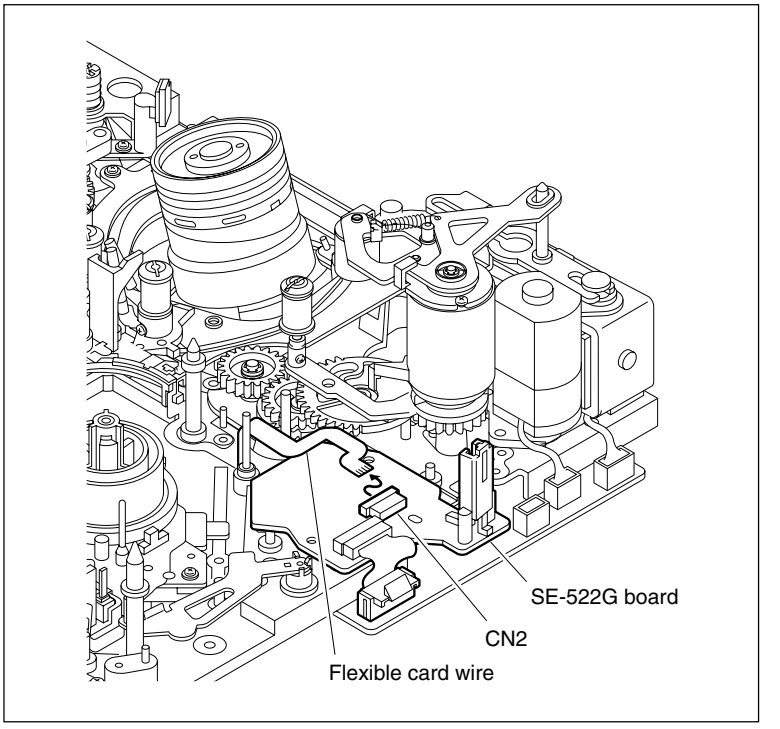
Remove the head cleaner. (Refer to Section 6-20.)

6. Removing the rail assembly

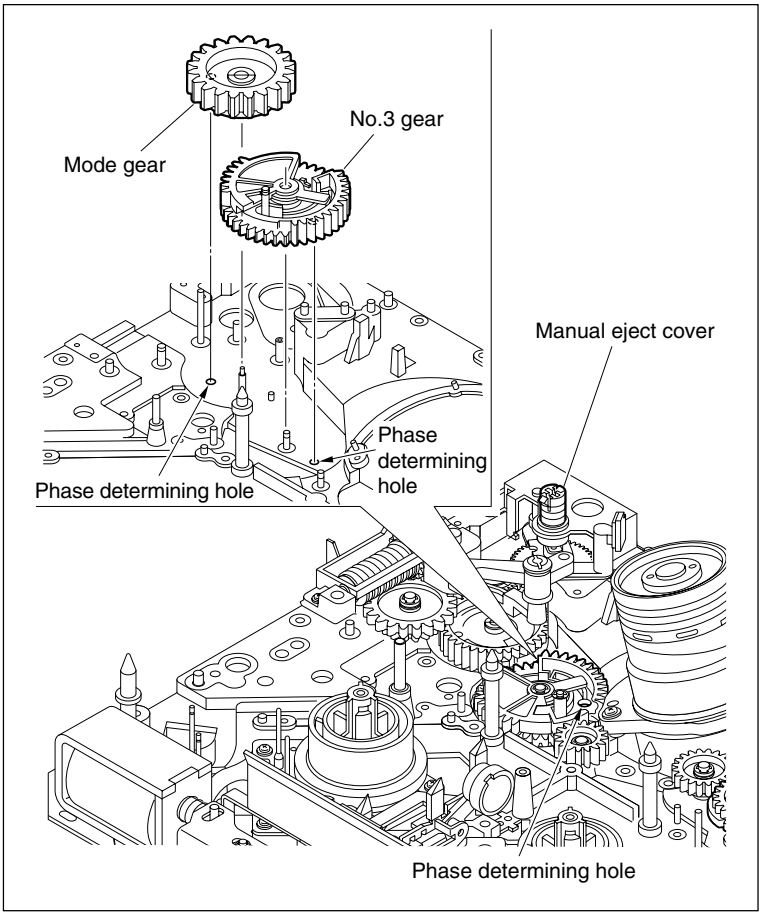
(1) Disconnect the flexible card wire from the connector (CN2) on the SE-522G board.

Note

Use extreme care not to fold and not to scratch the flexible card wire when disconnecting.



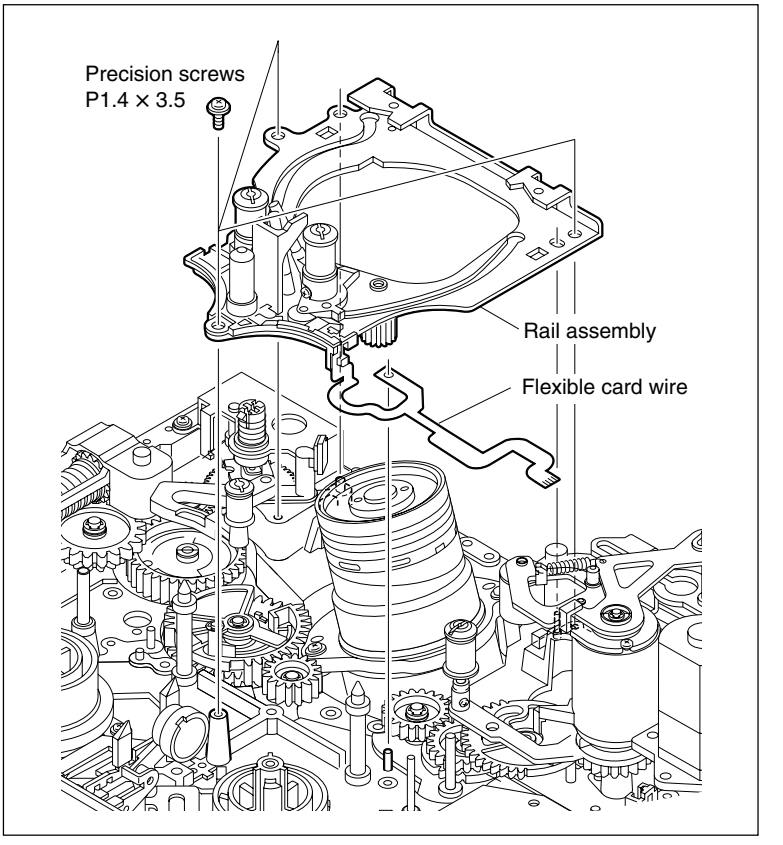
(2) Turn the manual eject cover clockwise and align the two phase determining holes in the mode gear assembly and in No.3 gear.



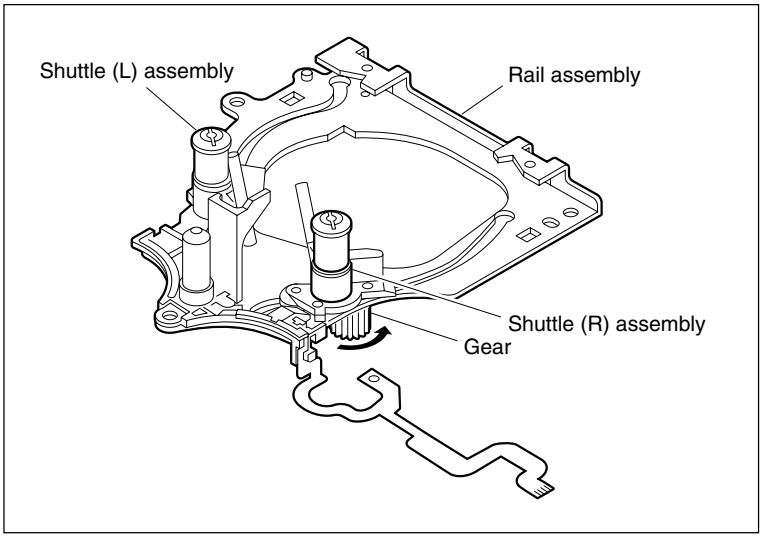
(3) Remove the three precision screws and remove the rail assembly.

Note

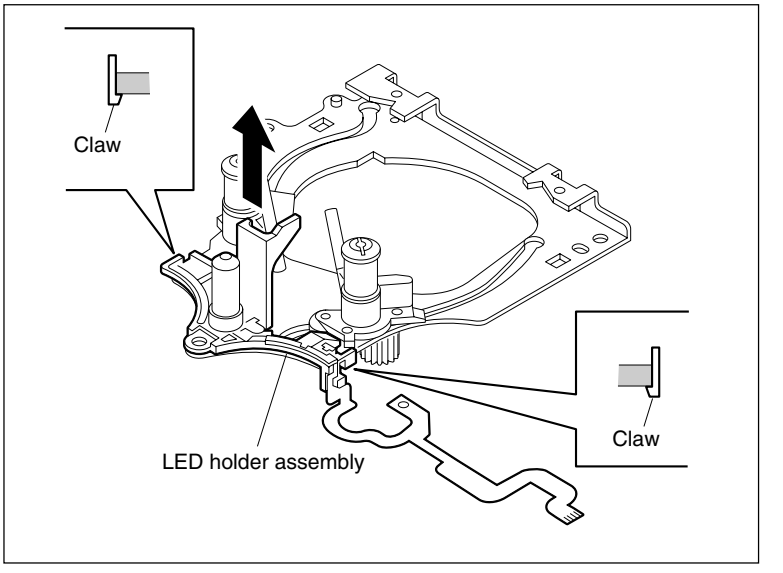
Use extreme care not to scratch the drum and the tape guide when removing. Also great care should be taken; not to fold and not to scratch the flexible card wire of the LED holder assembly when disconnecting.



(4) Bring both shuttle (R) and shuttle (L) assemblies to the threading position shown in the figure, by turning the gear on the back side of the rail assembly by a finger



(5) Unlock each two claws located on the left, right and middle side of the LED holder assembly with tweezers, and remove the LED holder assembly from the rail assembly.

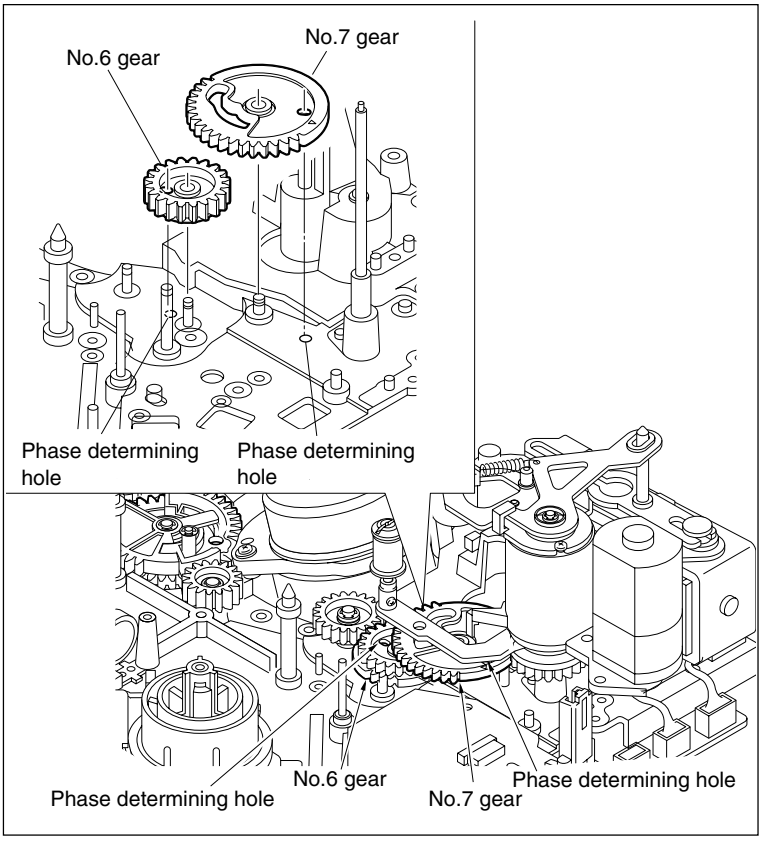


7. Reattaching the rail assembly

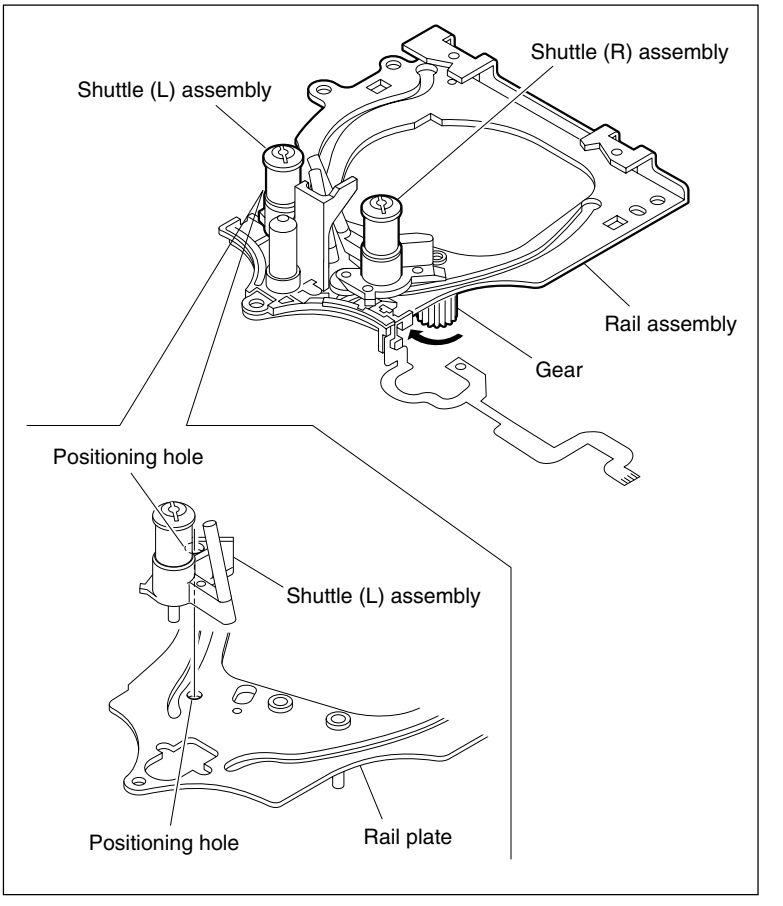
(1) Reattach a new rail assembly to the LED holder assembly.

(2) Ensure that the two phase determining holes in the mode gear assembly and in No.3 gear, which are already aligned in step 7- (2), are respectively aligned with the two holes in the MD chassis underneath each gear.

(3) Adjust the two phases determining holes in No.6 and No.7 gears to align respectively with the two holes in the MD chassis underneath each gear by turning No.7 gear by a finger.

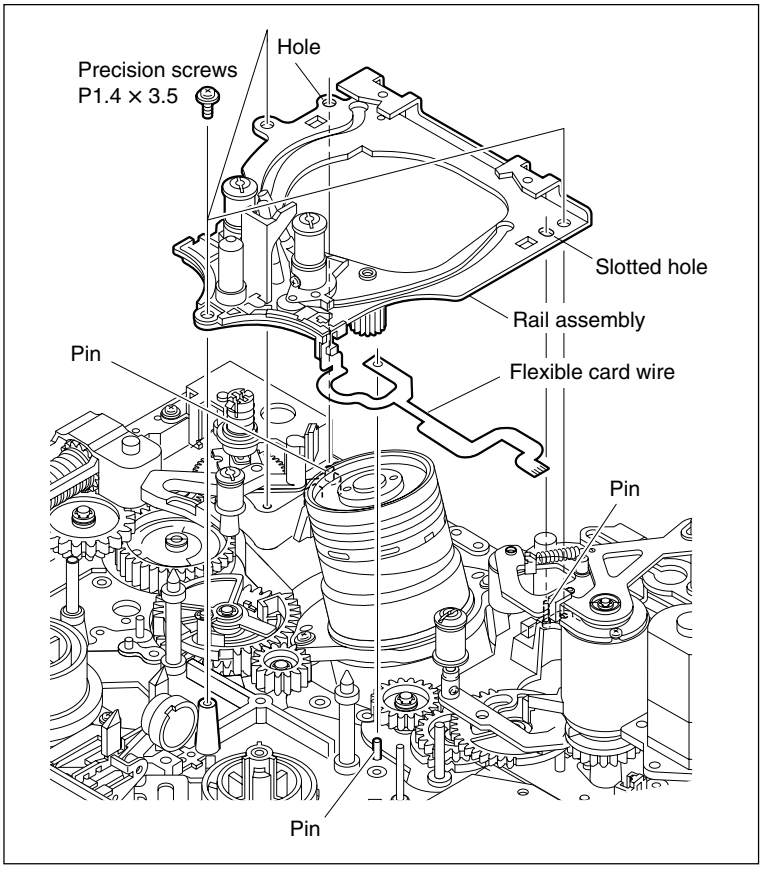


(4) Turn the gear on the back side of the rail assembly until the shuttle (R) and shuttle (L) assemblies push the LED holder assembly as far as it will go, and align the positioning hole of the shuttle (L) assembly with the positioning hole of the rail assembly.



(5) Keeping the state in step (4) and further more holding the gear phase between S side and T side, fit the hole and slotted hole in the rail assembly on the two pins on the MD chassis respectively.
(6) Fit the hole in the flexible card wire of LED holder assembly on the pin on the MD chassis.
(7) Fix the rail assembly with the three precision screws.
Tightening Torque : 0.1 N•m {1 kgf•cm}

(8) Reconnect the flexible card wire to the connector (CN2) on the SE-522G board.



8. Reattaching the head cleaner

Reattach the head cleaner. (Refer to Section 6-20.)

9. Reattaching the RMP retainer (T1) assembly

Fit the hole and slotted hole in the RMP retainer (T1) assembly on the pins on the MD chassis respectively, then fix it with the two screws.

10. Reattaching the T drawer arm assembly

Reattach the T drawer arm assembly.
(Refer to Section 6-11.)

11. Reattaching the S tension regulator assembly

Reattach the S tension regulator assembly.
(Refer to Section 6-10.)

12. Checking the threading/unthreading performance

Check the threading/unthreading is performed smoothly by turning the manual eject cover.

13. Cleaning the tape guide

Wipe the tape guides placed in followings with a cleaning cloth moistened with cleaning fluid.
- T drawer arm assembly
- S tension regulator assembly
- Shuttle (R) assembly
- Shuttle (L) assembly

Adjustment after Replacement

14. TENSION adjustment

(Refer to Section 4-3-4.)

15. Tape path adjustment

(Refer to Section 7-2.)

6-15. Capstan Motor Replacement

Outline

Replacement

Removing the DR-428BG board
Replacing the capstan motor
Reattaching the DR-428BG board
Cleaning the capstan shaft

Adjustment after replacement

CAPSTAN ONLY adjustment
Checking the tape path adjustment

Preparation

1. Set the unit in to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the bottom panel. (Refer to Section 2-7-2.)
5. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Replacement

1. Removing the DR-428BG board

(Refer to Section 6-26-5.)

2. Replacing the capstan motor

(1) While supporting the capstan motor by hand from the back side of the MD chassis, remove the two precision screws in the upper side of the chassis to remove the capstan motor.

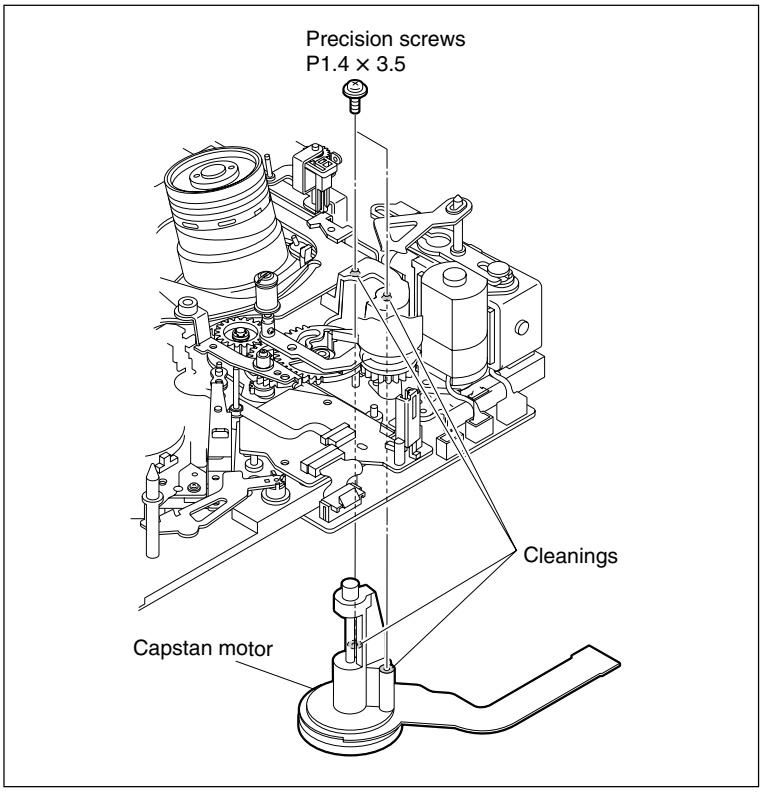
(2) Wipe the mounting surfaces of a new capstan motor and the MD chassis with a cleaning cloth moistened with cleaning fluid.

(3) Insert the new capstan motor into the hole in the MD chassis positioning as shown in the figure and fix it with the two precision screws.
Tightening torque : 0.1 N•m {1 kgf•cm}

Note

Use care not to scratch the capstan motor pivot when inserting the capstan motor.

(4) Reconnect the flexible card wire of the capstan motor on the back side of the unit to the connector (CN18) on the DR-428BG board.



3. Reattaching the DR-428BG board

(Refer to Section 6-26-5.)

4. Cleaning the Capstan shaft

Wipe the capstan shaft with a cleaning cloth moistened with cleaning fluid.

Adjustment after Replacement

5. CAPSTAN ONLY adjustment

(Refer to Section 4-3-4.)

6. Checking the tape path adjustment

(Refer to Section 7-4.)

6-16. Loading Motor Replacement

Outline

Replacement

Disconnecting the connector
Replacing the loading motor assembly
Reconnecting the connector

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Tweezers

Replacement

1. Disconnecting the connector

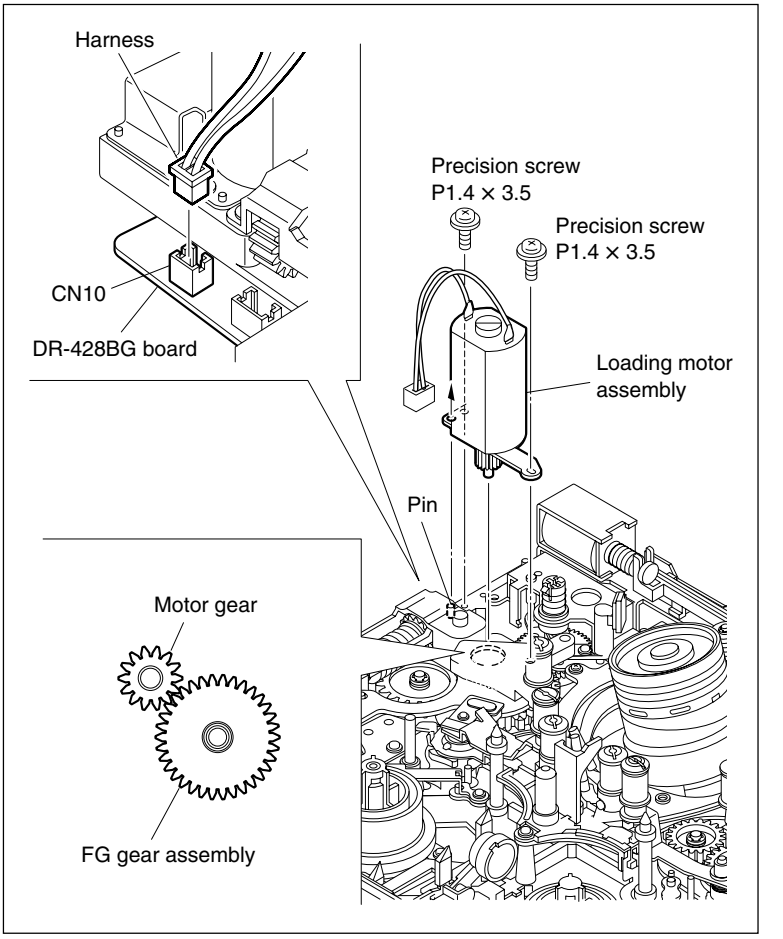
Disconnect the harness from the connector (CN10) on the DR-428BG board with tweezers.

2. Replacing the loading motor assembly

(1) Remove the two precision screws to remove the loading motor assembly.
(2) Align a positioning hole in a new loading motor with the positioning pin on the MD chassis and engage the motor gear with the FG gear.
(3) Fix the loading motor assembly with the two precision screws.
Tightening Torque : 0.1 N•m {1 kgf•cm}

3. Reconnecting the connector

Reconnect the harness to the connector (CN10) on the DR-428BG board with tweezers.



6-17. Reel Shift Motor Assembly Replacement

Outline

Replacement

Removing the pinch limiter assembly
Removing the pinch solenoid assembly
Replacing the reel shift motor assembly
Reattaching the pinch solenoid assembly
Reattaching the pinch limiter assembly

Note

Prepare a new stop washer when replacing the reel shift motor assembly.
Stop washer (1.5) : 3-669-465-01 × 1 (for mounting the pinch limiter assembly)

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Tweezers

Replacement

1. Removing the pinch limiter assembly

Remove the pinch limiter assembly.
(Refer to Section 6-4.)

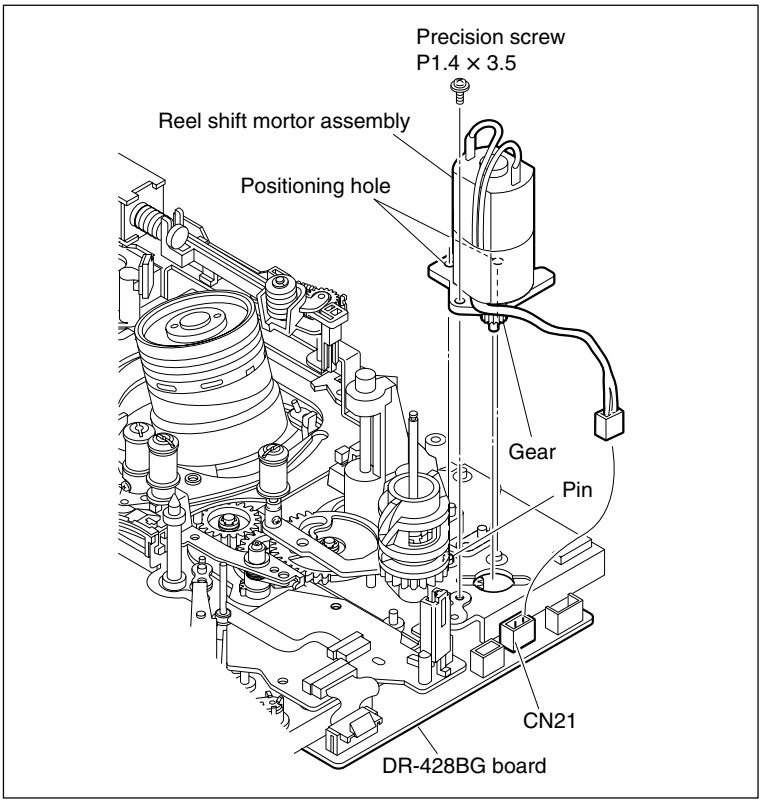
2. Removing the pinch solenoid assembly

Remove the pinch solenoid assembly.
(Refer to Section 6-6.)

3. Replacing the reel shift motor assembly

(1) Disconnect the harness of the reel shift motor assembly from the connector (CN21) on the DR-428BG board with tweezers.
(2) Remove the precision screw to remove the reel shift motor assembly.
(3) Fit two holes in a new reel shift motor assembly shown in the figure on the two pins on the MD chassis and engage it with the gear A.
(4) Reattach the reel shift motor assembly with the precision screw.
Tightening Torque : 0.1 N•m {1 kgf•cm}

(5) Reconnect the harness of the reel shift motor to the connector (CN21) on the DR-428BG board.



4. Reattaching the pinch solenoid assembly

Reattach the pinch solenoid assembly.
(Refer to Section 6-6.)

5. Reattaching the pinch limiter assembly

Reattach the pinch limiter assembly.
(Refer to Section 6-4.)

6-18. MIC Assembly Replacement

Outline

Replacement

Disconnecting the flexible card wire
Moving the S/T reel tables
Removing the L push plate
Removing the MIC spring
Replacing the MIC assembly
Moving the S/T reel tables
Reattaching the MIC spring
Reattaching the L push plate
Reconnecting the flexible card wire

Note

Prepare a new stop washer when replacing the MIC assembly.
Stop washer (1.5) : 3-699-465-01
Do avoid touching the terminal on the MIC holder and wiping it with cleaning fluid. When need cleaning, wipe it carefully with a soft dry cloth.
Use care not to lose a poly-slider washer between the base plate and the MIC assembly.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

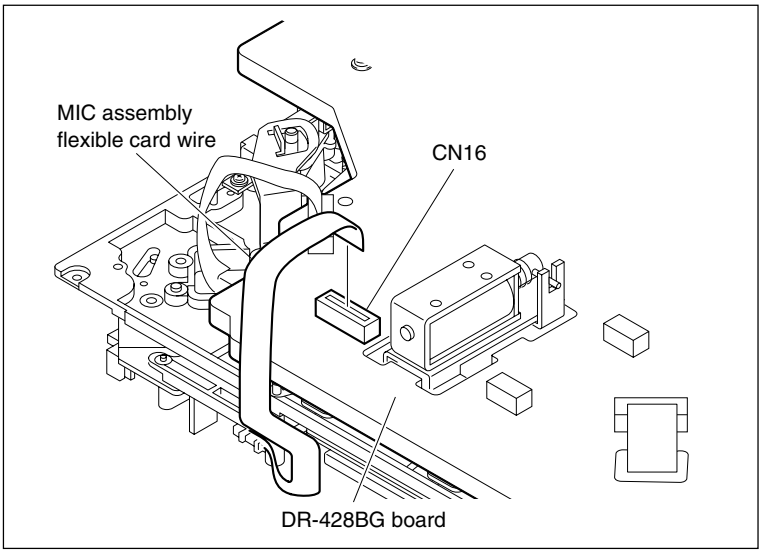
Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Tweezers

Replacement

1. Disconnecting the flexible card wire

Disconnect the flexible card wire from the connector (CN16) on the DR-428BG board located on the back side of the MD chassis.

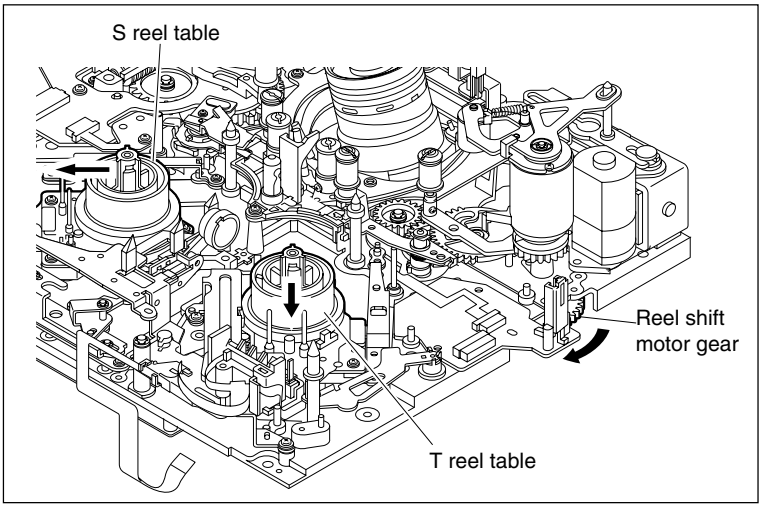


2. Moving the S/T reel tables

Turn the reel shift motor gear in the arrow direction by a skewer and bring the S/T reel tables to the standard cassette position (the most front side).

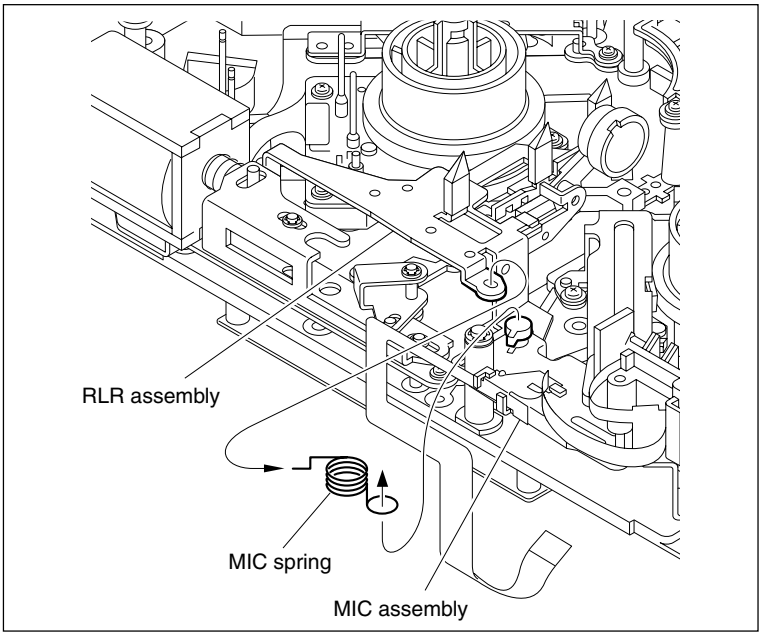
3. Removing the L push plate

Remove the L push plate. (Refer to Section 6-7.)



4. Removing the MIC spring

Unhook the hooks on the both ends of the MIC spring which hold the MIC arm and the RLR assemblies.



5. Replacing the MIC assembly

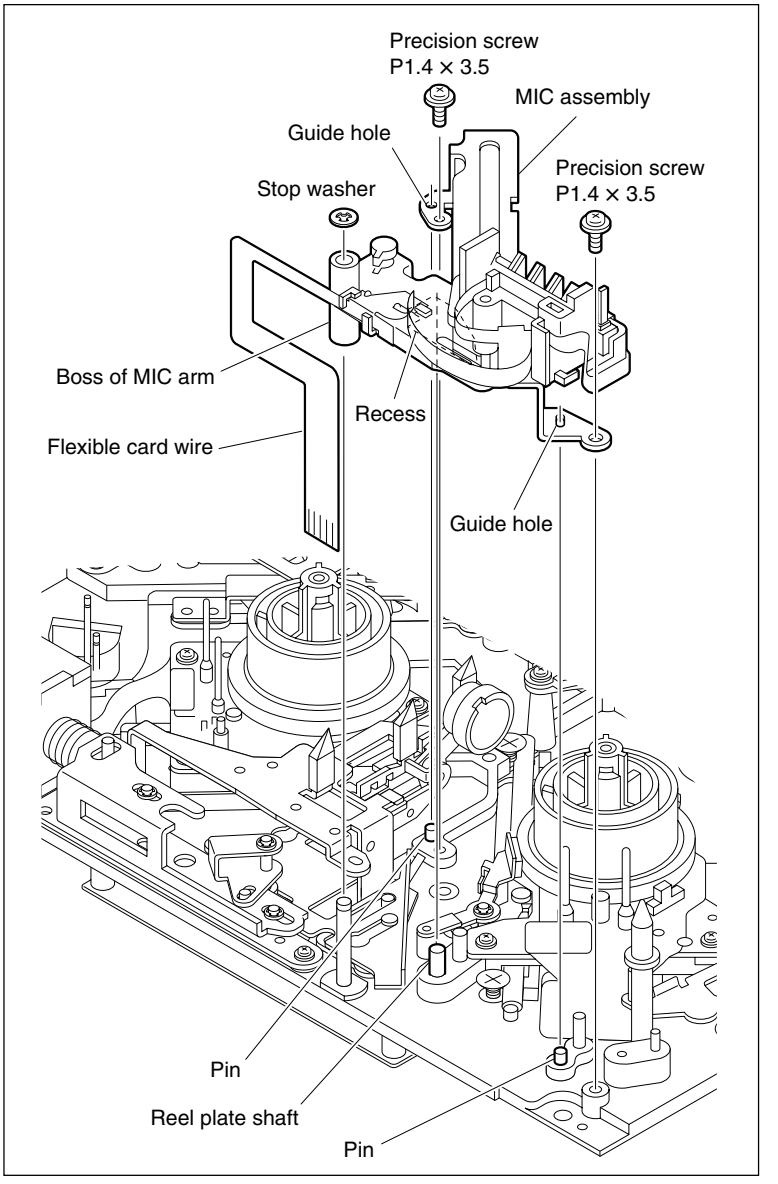
(1) Remove the stop washer and the two precision screws which secure the MIC assembly to the MD chassis, and remove the MIC assembly.

(2) Insert a tip of the flexible card wire of a new MIC assembly between the chassis and the front MD chassis to bring it to the back side of the unit.

Note

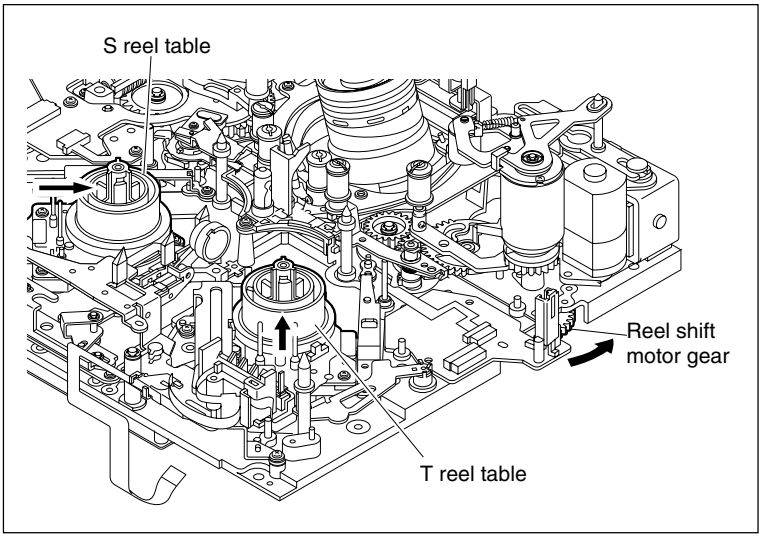
Use great care not to fold and scratch the flexible card wire during this operation.

(3) Fit the boss of the MIC arm on the shaft of the MD chassis and also fit the recess on the reel plate shaft.
Fit the two guide holes in the MIC assembly on the pins on the MD chassis, and fix the assembly with the two precision screws and a new stop washer.
Tightening Torque : 0.1 N•m {1 kgf•cm}



6. Moving the S/T reel tables

Turn the reel shift motor gear in the arrow direction by a skewer and bring the S/T reel tables to the S-cassette position (the drum side). Confirm that the S/T reel tables and the MIC assembly shift smoothly.



7. Reattaching the MIC spring

Reattach the MIC spring removed in step 5 to the MIC arm and RLR assemblies.

8. Reattaching the L push plate

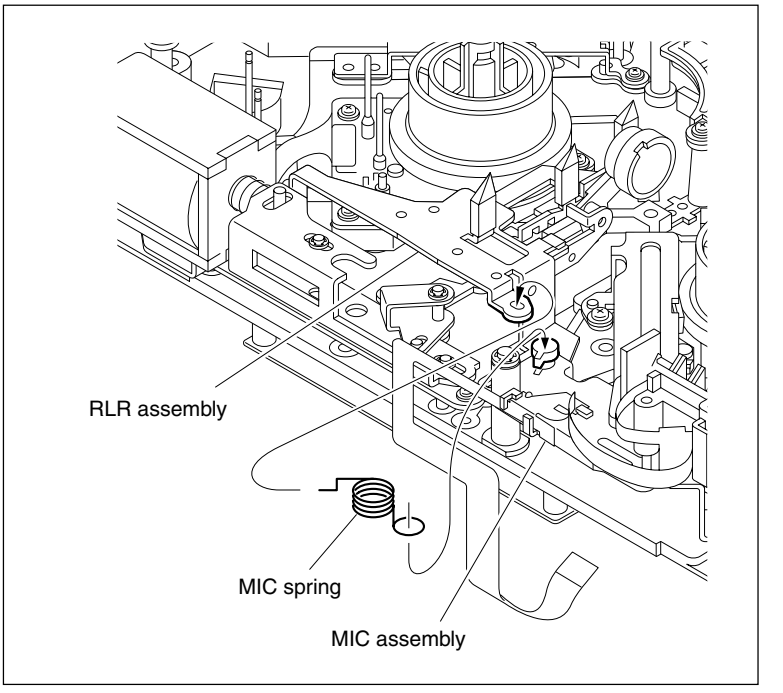
Reattach the L push plate. (Refer to Section 6-7.)

9. Reconnecting the flexible card wire

Reconnect the flexible card wire to the connector (CN16) on the DR-428BG board located on the back side of the MD chassis.

10. Reattaching the MD assembly

Reattach the MD assembly.
(Refer to Section 6-23.)



6-19. MIC Holder Assembly Replacement

Outline

Replacement

Removing the MIC assembly
Replacing the MIC holder assembly
Reattaching the MIC assembly

Note

Prepare new stop washers when replacing the MIC holder.
Stop washer (1.2) : 3-559-408-11 × 2 (for mounting the MIC holder assembly)
Stop washer (1.5) : 3-669-465-01 × 1 (for mounting the MIC assembly)
Do avoid touching the terminal on the MIC holder and wiping it with cleaning fluid. When need cleaning, wipe it carefully with a soft dry cloth.
Use care not to lose a poly-slider washer between the base plate and the MIC assembly.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Washer mounting fixture Ø1.2 : J-6082-232-A
- Tweezers

Replacement

1. Removing the MIC assembly

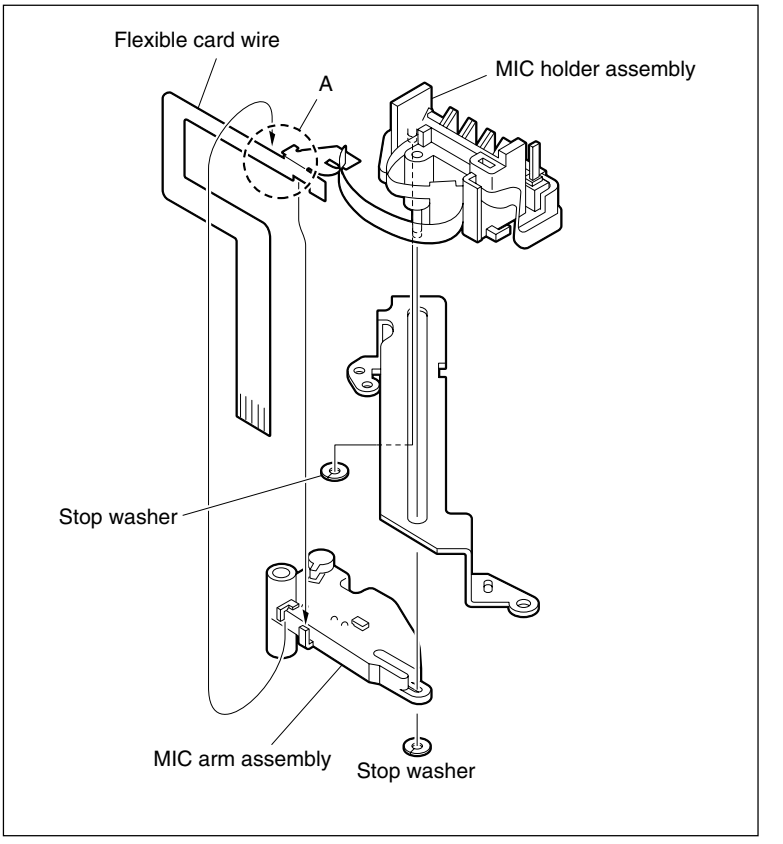
Remove the MIC assembly.
(Refer to Section 6-18.)

2. Replacing the MIC holder subassembly

(1) Remove the portion A shown of the flexible card wire from the MIC arm assembly as shown in the figure.
(2) Remove the two stop washers from the back side of the MIC assembly and remove the MIC holder assembly.
(3) Fix a new MIC holder assembly to the MIC assembly with two new stop washers (1.2).

Note

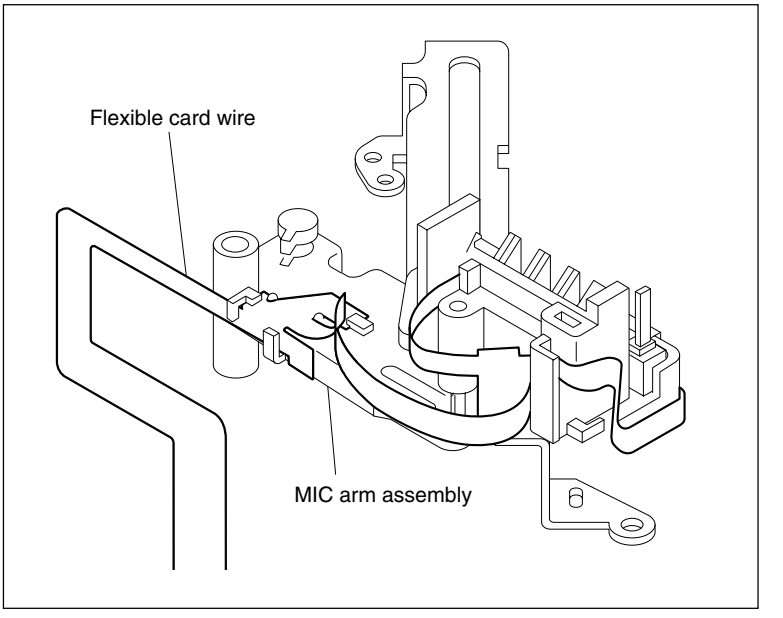
Use great care not to fold and not to scratch the flexible card wire when reattaching.



(4) Fix the flexible card wire to the MIC arm assembly as shown in the figure.
(5) Insert a tip of the flexible card wire of the MIC assembly between the chassis and the front MD chassis to bring it to the back side of the unit.

Note

Use extreme care not to fold and not to scratch the flexible card wire at this operation.



3. Reattaching the MIC assembly

Reattach the MIC assembly.
(Refer to Section 6-18.)

6-20. HC Roller Assembly Replacement

Outline

Replacement

Disconnecting the connector
Removing the head cleaner assembly
Replacing the HC roller assembly
Reattaching the head cleaner assembly
Checking the performance of the head cleaner assembly
Reconnecting the connector

Note

Prepare a new stop washer when replacing the HC roller assembly.
Stop washer (0.8) : 3-315-414-31 × 1
Bare-handed touch to the HC roller assembly is prohibited. Do put on cloth gloves before replacing.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.8 : J-6082-233-A

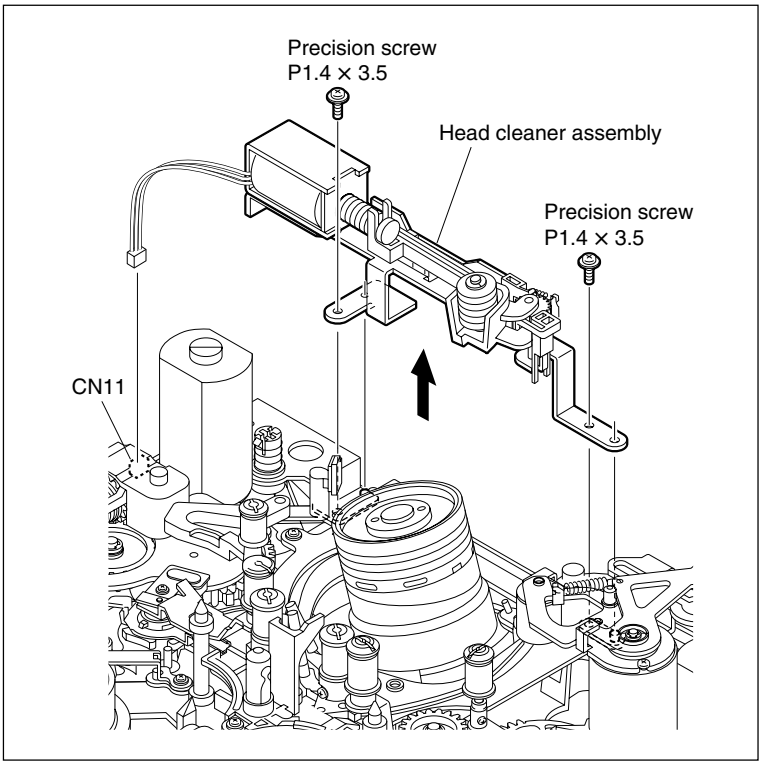
Replacement

1. Disconnecting the connector

Disconnect the harness from the connector (CN11) on the DR-428BG board with tweezers.

2. Removing the head cleaner assembly

Remove the two precision screws and pull off the head cleaner assembly in the arrow direction.



3. Replacing the HC roller assembly

(1) Remove the stop washer to remove the HC roller assembly.

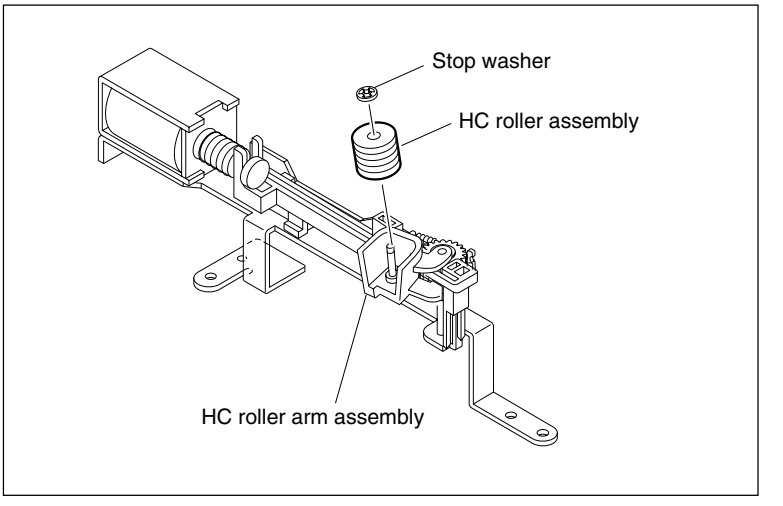
(2) Attach a new HC roller assembly with a new stop washer.

Note

Avoid bare-handed touch to the HC roller assembly.

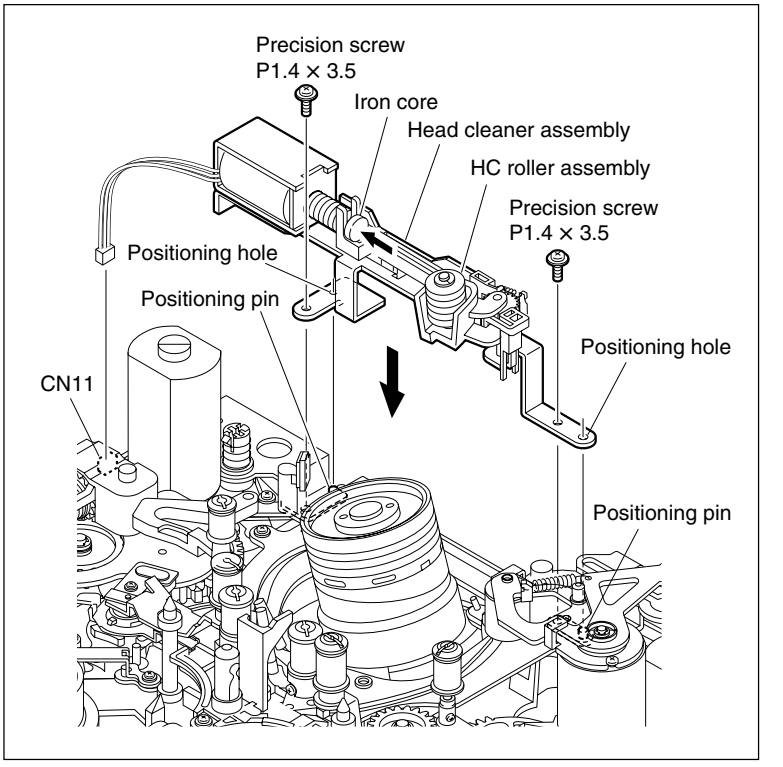
In addition, do not give an excessive force to it at removal and reattachment, it may cause deformation.

Operation supporting the back side of the HC roller assembly by fingers is required.



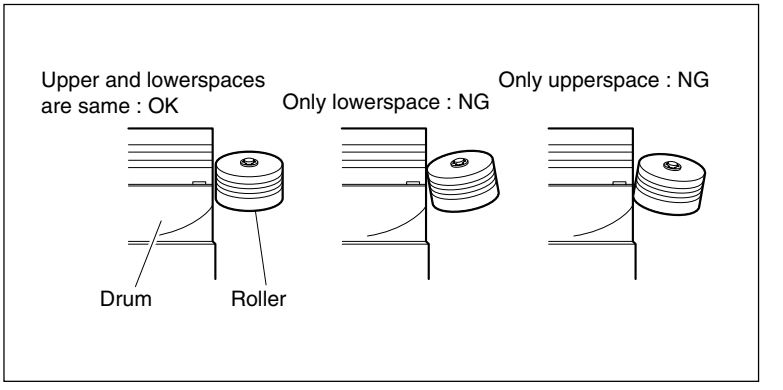
4. Reattaching the head cleaner assembly

Align the two positioning holes in the head cleaner assembly with the two positioning pins on the MD chassis and fix the assembly with the two precision screws.
Tightening torque : 0.1 N•m {1 kgf•cm}



5. Checking the performance of the head cleaner assembly

Check that the HC roller assembly contacts the drum assembly in parallel when the solenoid's iron core of the head cleaner assembly is in the pull-in state by being pressed in the arrow direction.



6. Reconnecting the connector

Reconnect the harness to the connector (CN11) on the DR-428BG board.

6-21. Head Cleaner Solenoid Replacement

Outline

Replacement

Removing the head cleaner assembly
Replacing the head cleaner solenoid
Reattaching the head cleaner assembly
Checking the performance of the head cleaner assembly

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A

Replacement

1. Removing the head cleaner assembly

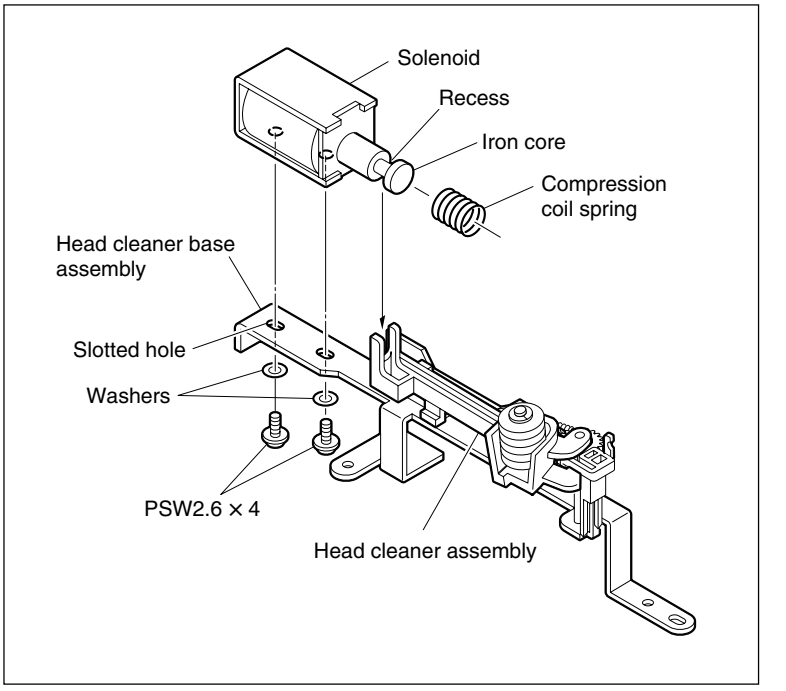
Remove the head cleaner assembly.
(Refer to Section 6-20.)

2. Replacing the head cleaner solenoid

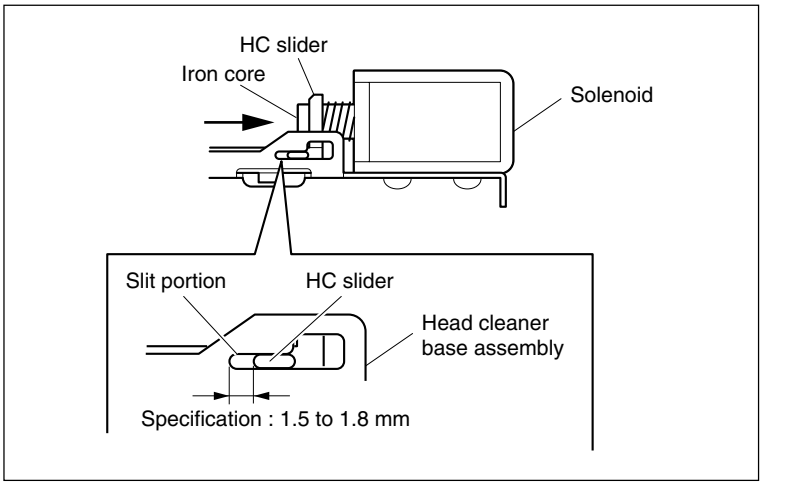
(1) Remove the two screws and two washers on the back side of the head cleaner assembly.
(2) Remove the solenoid with the spring on it.
(3) Remove the compression coil spring from the solenoid.
(4) Fit the compression coil spring on a new solenoid's iron core.
(5) Pull out the iron core until a recess comes in sight, then fix the solenoid to the head cleaner assembly.
(6) Align the two holes in the solenoid with the two slotted holes in the HC base assembly and fix temporally with the two screws and two washers.

Note

Tighten the screws just enough to move the head cleaner solenoid.



(7) Adjust the solenoid position to meet the specification of the clearance between the slit portion of the head cleaner base assembly and the tip of the HC slider under the condition that the iron core comes to the pull-in state by being pressed in the arrow direction, then tighten the two screws.
Tightening torque : 0.2 N•m {2 kgf•cm}



3. Reattaching the head cleaner assembly

Reattach the head cleaner assembly.
(Refer to Section 6-20.)

4. Checking the performance of the head cleaner assembly

Check the performance of the head cleaner assembly. (Refer to Section 6-20.)

6-22. Cassette Compartment Motor Replacement

Outline

Replacement

Removing the motor gear assembly
Replacing the motor assembly
Reattaching the motor gear assembly

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 2-7-1.)
4. Remove the cassette compartment. (Refer to Section 2-8.)

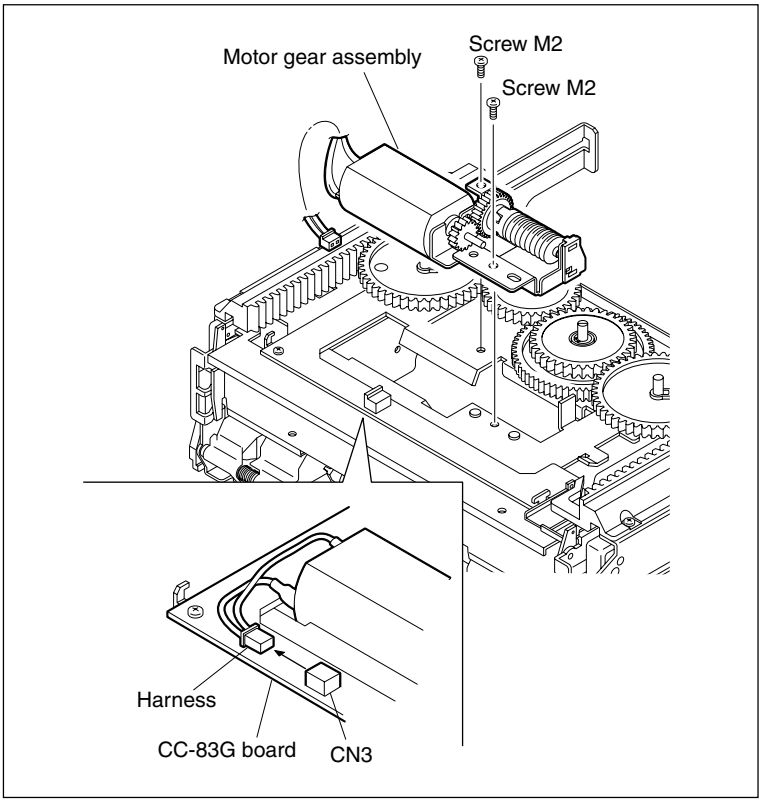
Tools

- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Torque screwdriver's bit (for M2) : J-6325-380-A
- Grease (SGL-941) : 7-662-001-39
- Tweezers

Replacement

1. Removing the motor gear assembly

(1) Remove the harness of the motor gear from the connector (CN3) on the CC-83G board in the cassette compartment.
(2) Remove the motor gear assembly from the cassette compartment by removing the two screws.



2. Replacing the motor assembly

(1) Release the upper and lower claws of the pivot bracket to remove the pivot bracket.

Note

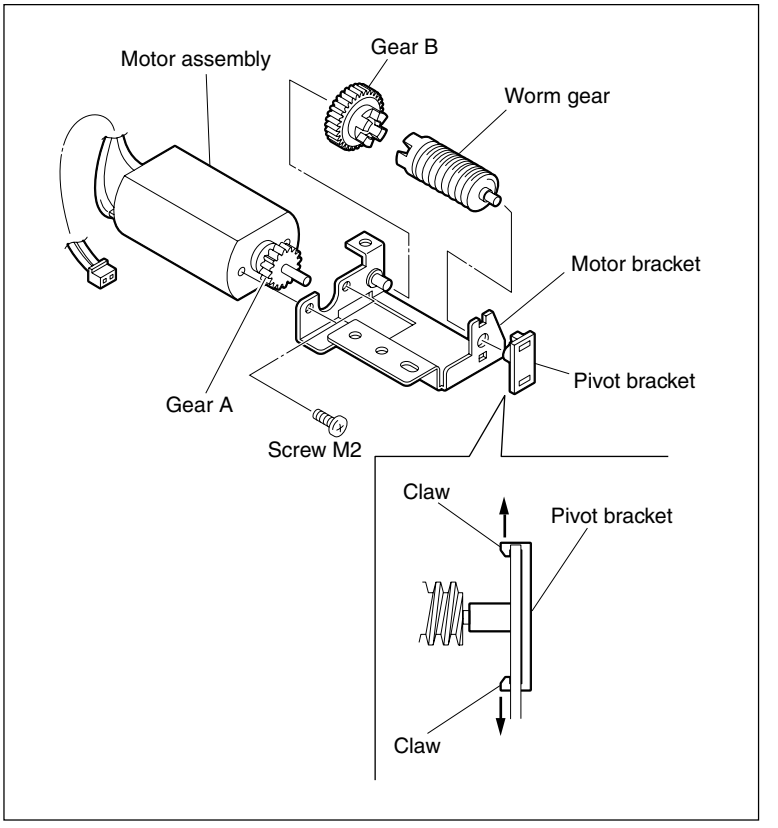
Be careful not to lose the worm gear, which also comes off at this operation.

(2) Remove the gear B from the shaft of the motor bracket assembly.
(3) Remove the two screws to remove the motor assembly from the motor bracket.
(4) Fix a new motor assembly to the motor bracket positioning as shown in the figure with the two screws.

Note

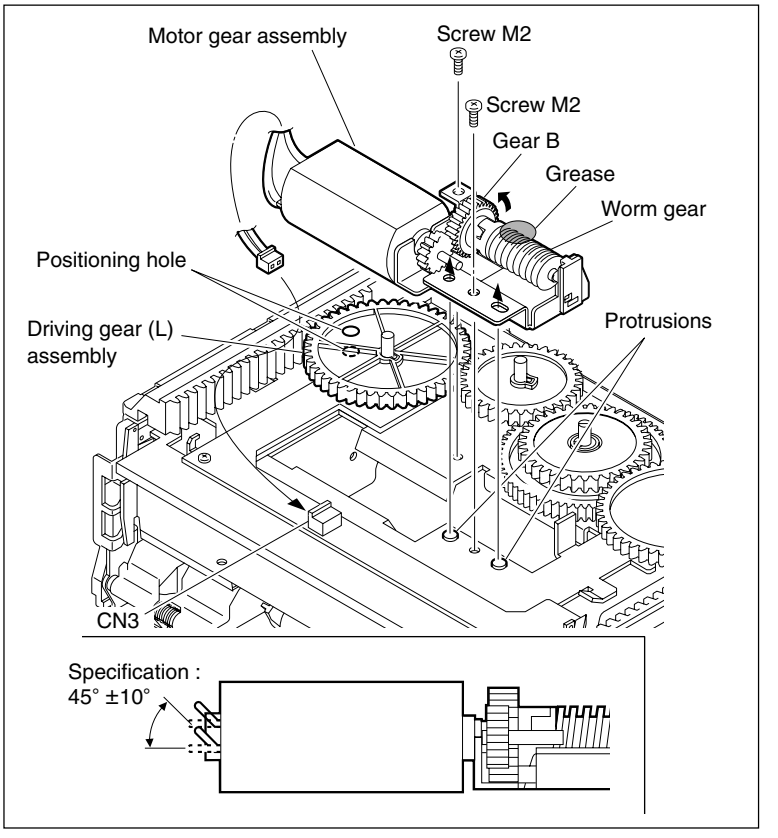
Be reminded a new motor assembly has the gear A on its shaft.
Tightening torque : 0.2 N•m {2 kgf•cm}

(5) Reattach the gear B to the shaft of the motor bracket assembly.
(6) Make a coupling between the worm gear and the gear B and insert the pivot bracket shaft from another side of the worm gear.
(7) Fix the upper and lower claws to the motor bracket.



3. Reattaching the motor gear assembly

(1) Bend the two terminals in the motor gear assembly to meet the specification of their bent angle shown in the figure.
(2) With the worm gear in the motor gear assembly engaged with the worm wheel, insert the two protrusions of the motor gear assembly into the holes in the cassette compartment and fix with two screws.
(3) Align the hole in the drive gear (L) assembly with the hole in the cassette compartment by turning the gear B of the motor gear assembly by a finger.
(4) Apply a grain of grease on the worm gear in the motor gear assembly.
(5) Reconnect the harness of the motor gear assembly to the connector (CN3) on the CC-83G board.



6-23. Removing/Installing the MD Assembly

Note

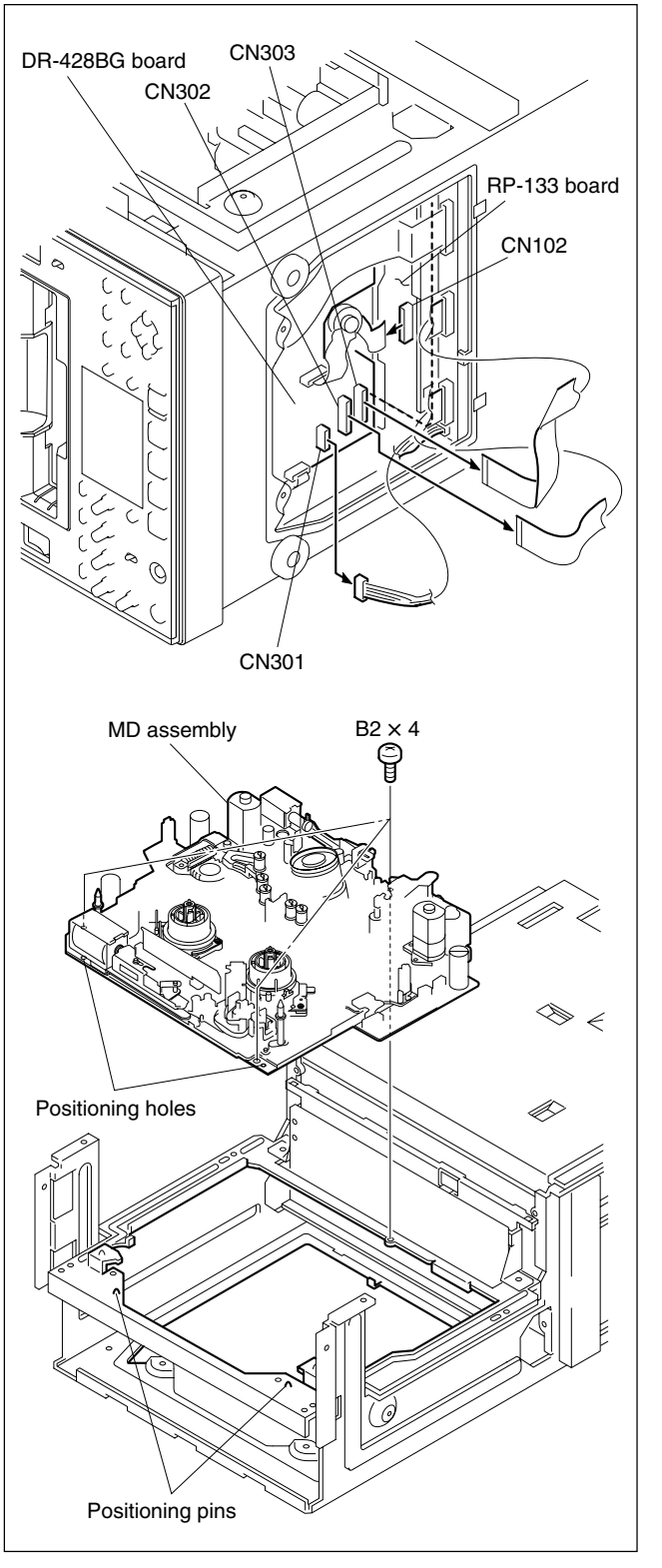
Before removing the assembly, be sure to turn off the main power.

Removal

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the bottom panel. (Refer to Section 2-7-2.)
3. Remove the harnesses and the flexible card wires connected to the three connectors (CN302, CN303, CN301) on the DR-428BG board.
4. Remove the flexible card wire connected to the connector (CN102) on the RP-133 board.
5. Remove the front panel. (Refer to Section 2-7-3.)
6. Remove the three screws and remove the MD assembly.

Installation

1. Insert the positioning pins on the main unit into the positioning holes on the MD assembly.
2. Attach the MD assembly with the three screws.
3. Attach the front panel. (Refer to Section 2-7-3.)
4. Connect the harnesses and flexible card wires to the three connectors (CN302, CN303, CN301) on the DR-428BG board and the connector (CN102) on the RP-133 board.
5. Attach the bottom panel. (Refer to Section 2-7-2.)
6. Attach the top panel. (Refer to Section 2-7-1.)

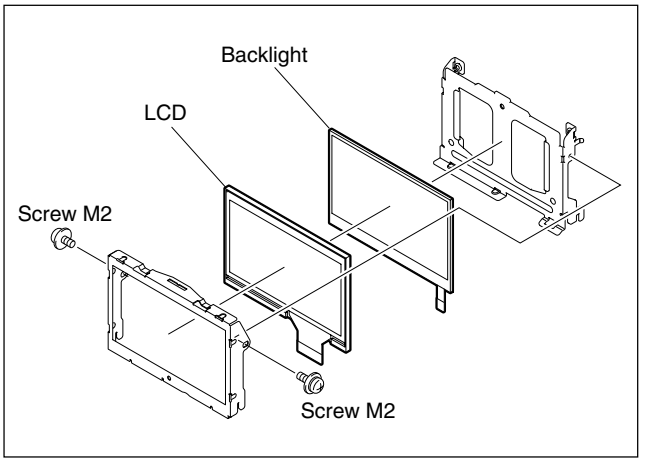


6-24. LCD Replacement

Note

When attaching the option boards, be sure to turn off the main power.

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the front panel. (Refer to Section 2-7-2.)
3. Remove the KY-616 board.
   (Refer to Section 6-26-10.)
4. Remove the KY-614 board.
   (Refer to Section 6-26-11.)
5. Remove the LCD assembly.
   (Refer to Section 6-26-11.)
6. Remove the two screws and remove the LCD.
7. Re-attach the parts in reverse order of the disassembling procedure.



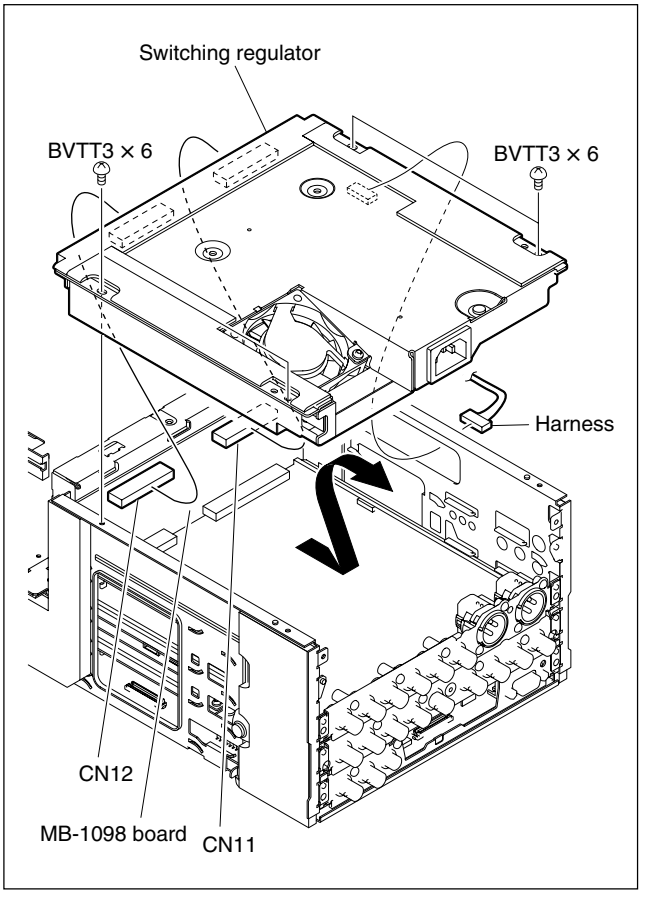
6-25. Removing/Installing the Switching Regulator

Note

Before removing the regulator, be sure to turn off the main power.

Removal

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the rear panel. (Refer to Section 2-7-4.)
3. Remove the harness connected to the connector (CN2) of the switching regulator.
4. Remove the four screws and remove the switching regulator in the direction of the arrow.
5. Re-attach the parts in reverse order of the disassembling procedure.



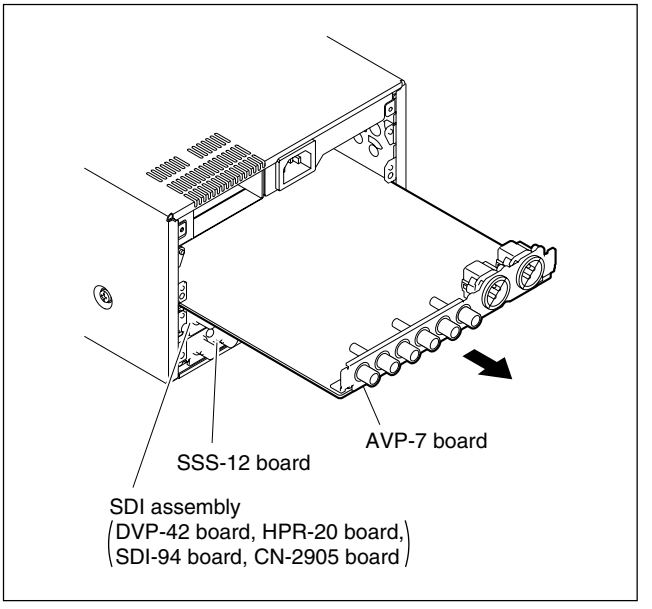
6-26. Removing/Installing the Mounted Board

Note

Before removing the boards, be sure to turn off the main power.

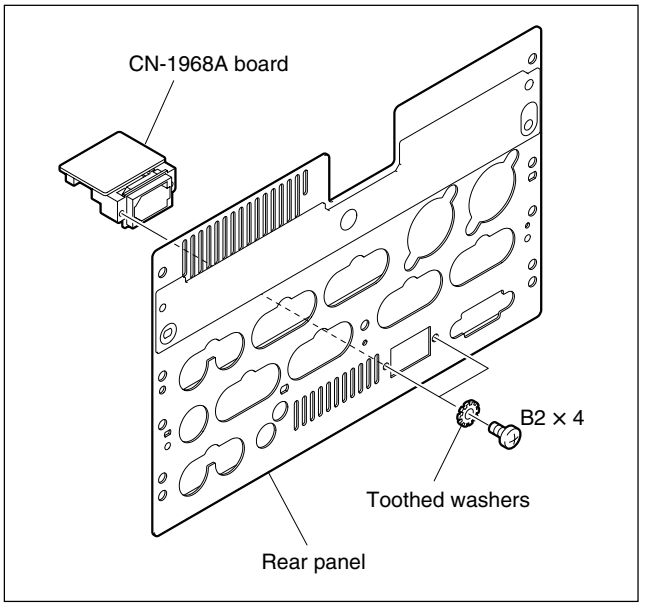
6-26-1. Plug-in Board

1. Remove the rear panel. (Refer to Section 2-7-4.)
2. Pull out the plug-in board in the direction of the arrow.
3. Re-attach the parts in reverse order of the disassembling procedure.



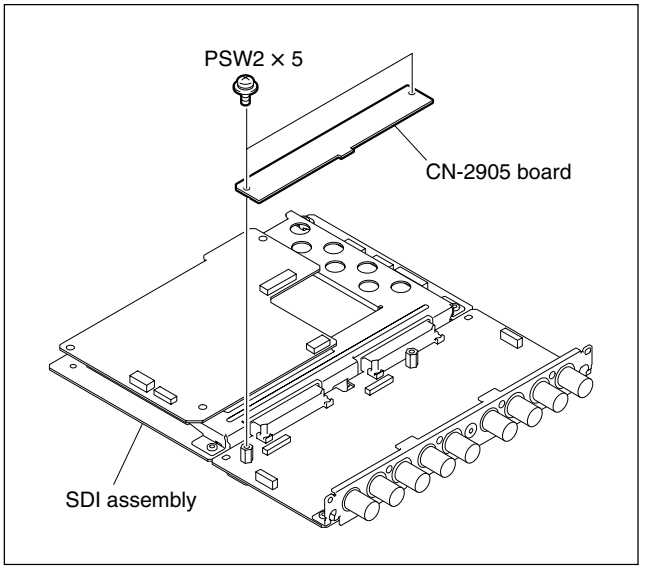
6-26-2. CN-1968A Board

1. Remove the rear panel. (Refer to Section 2-7-4.)
2. Remove the two screws and two toothed washers, and remove the CN-1968A board.
3. Re-attach the parts in reverse order of the disassembling procedure.



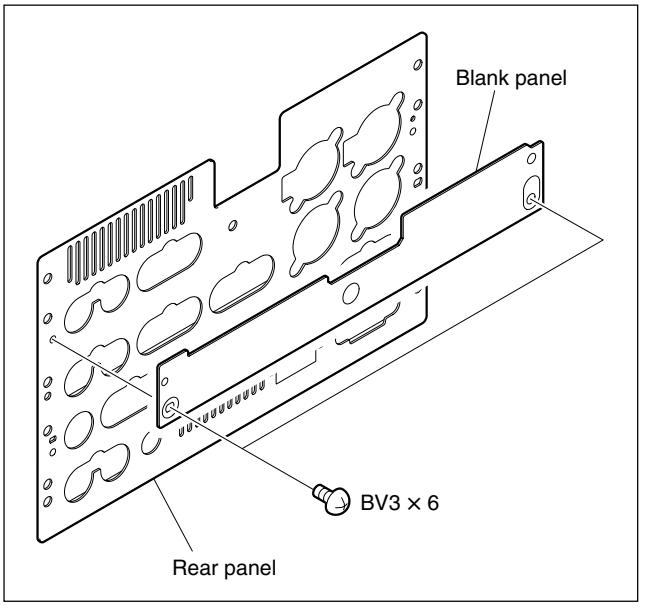
6-26-3. CN-2905 Board

1. Remove the rear panel. (Refer to Section 2-7-4.)
2. Remove the SDI assembly. (Refer to Section 6-26-1.)
3. Remove the two screws and remove the CN-2905 board.
4. Re-attach the parts in reverse order of the disassembling procedure.

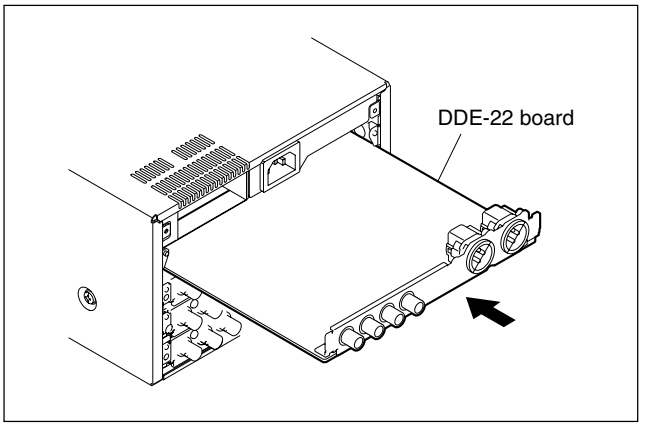


6-26-4. DDE-22 Board

1. Remove the rear panel. (Refer to Section 2-7-4.)
2. Remove the two screws and remove the blank panel.

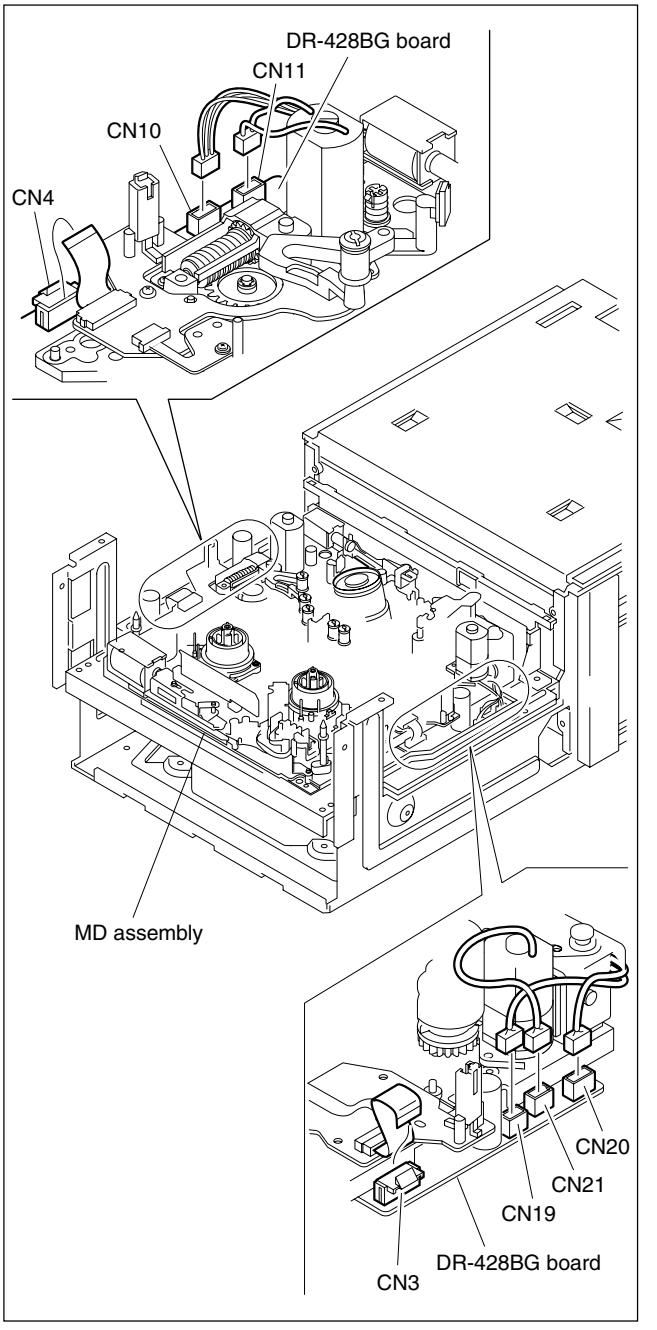


3. Insert the DDE-22 board to the specified slot and securely connect the board to the MB-1098 board.
4. Attach the rear panel. (Refer to Section 2-7-4.)

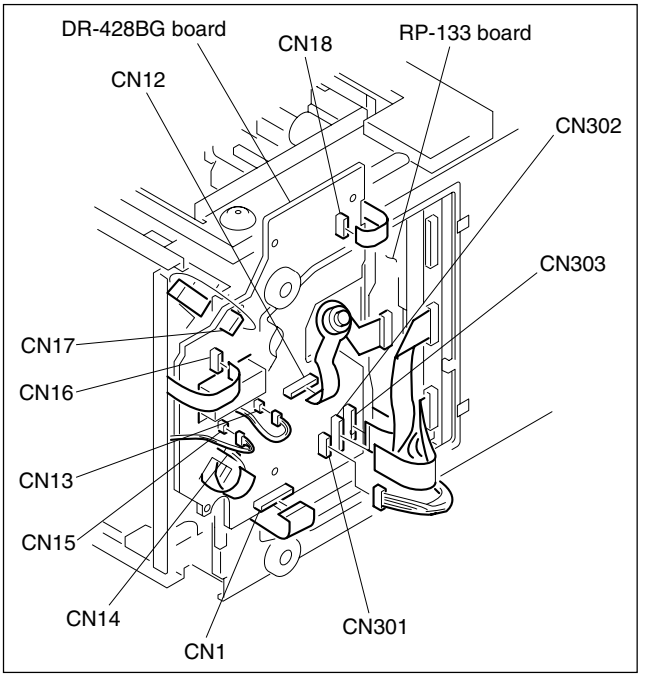


6-26-5. DR-428BG Board

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the bottom panel. (Refer to Section 2-7-2.)
3. Remove the cassette compartment. (Refer to Section 2-8.)
4. Remove the harnesses and flexible card wires from the seven connectors (CN4, CN10, CN11, CN3, CN19, CN20, CN21) on the DR-428BG board.



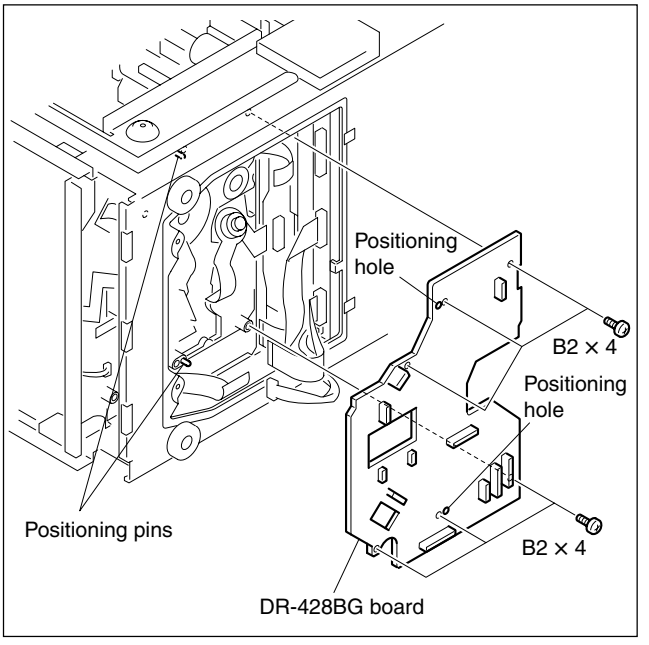
5. Stand the unit with the left side down.
6. Remove the harnesses and flexible card wires from the 11 connectors (CN1, CN12, CN13, CN14, CN15, CN16, CN17, CN18, CN301, CN302, CN303) on the DR-428BG board.



7. Remove the six screws securing the DR-428BG board.
8. Re-attach the parts in reverse order of the disassembling procedure.

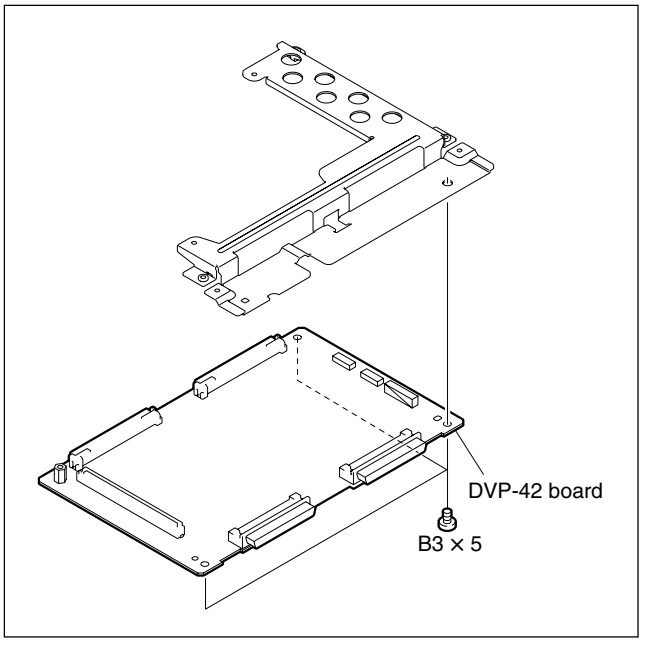
Note

When attaching the parts, align the two positioning holes on the DR-428BG board with the positioning pins.



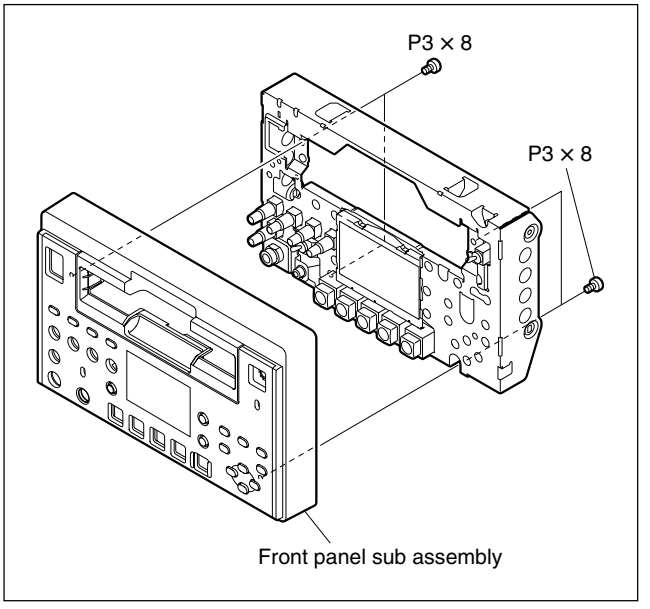
6-26-6. DVP-42 Board

1. Remove the rear panel. (Refer to Section 2-7-4.)
2. Remove the SDI assembly. (Refer to Section 6-26-1.)
3. Remove the SDI-94 board. (Refer to Section 6-26-13.)
4. Remove the HPR-20 board. (Refer to Section 6-26-8.)
5. Remove the three screws and remove the DVP-42 board.
6. Re-attach the parts in reverse order of the disassembling procedure.

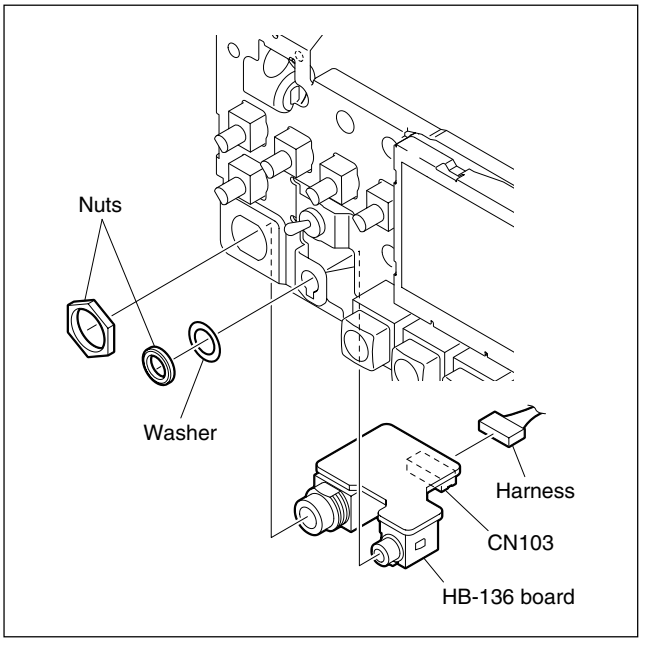


6-26-7. HP-136 Board

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the front panel. (Refer to Section 2-7-2.)
3. Remove the KY-616 board.
   (Refer to Section 6-26-10.)
4. Remove the four screws and remove the front panel sub assembly.

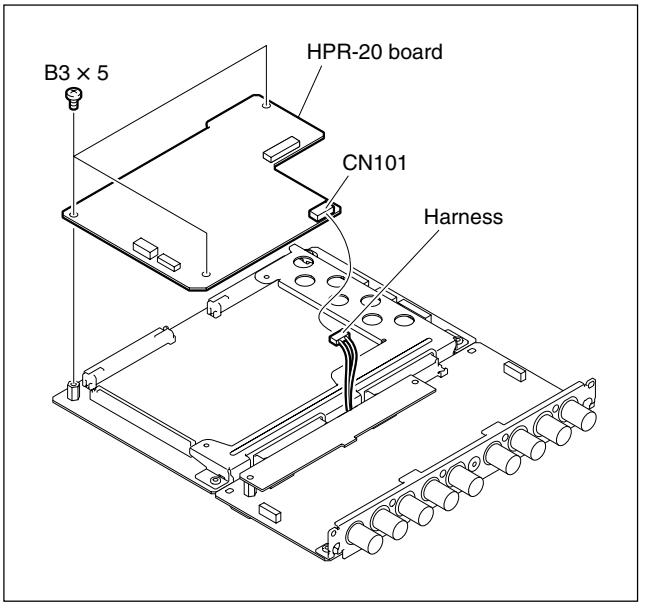


5. Remove the two nuts and the washer, and remove the HP-136 board.
6. Remove the harness from the connector (CN103) on the HP-136 board.
7. Re-attach the parts in reverse order of the disassembling procedure.



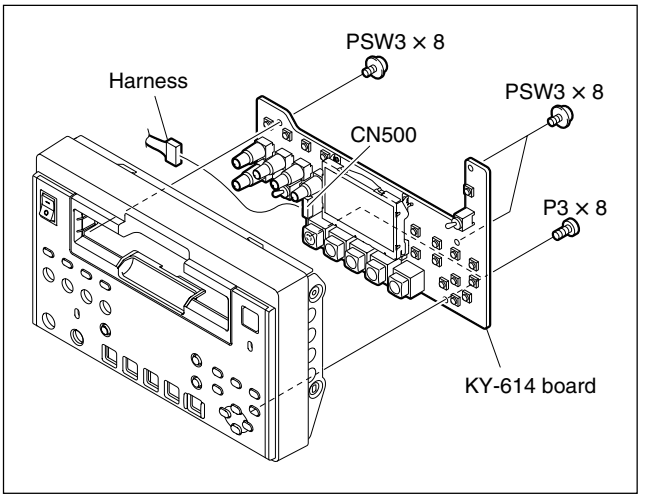
6-26-8. HPR-20 Board

1. Remove the rear panel. (Refer to Section 2-7-4.)
2. Remove the SDI assembly. (Refer to Section 6-26-1.)
3. Remove the harness from the connector (CN101) on the HPR-20 board.
4. Remove the three screws and HPR-20 board.
5. Re-attach the parts in reverse order of the disassembling procedure.

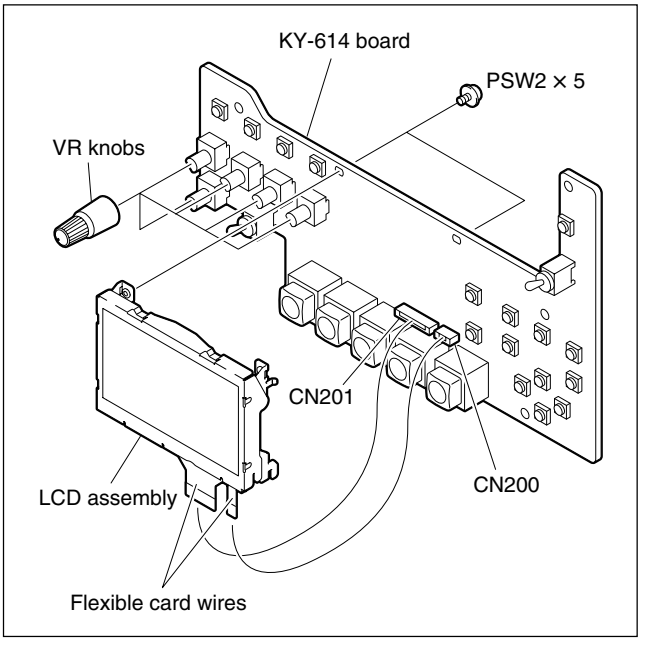


6-26-9. KY-614 Board

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the front panel. (Refer to Section 2-7-2.)
3. Remove the KY-616 board.
   (Refer to Section 6-26-10.)
4. Remove the five screws and remove the KY-614 board.
5. Remove the harness from the connector (CN500) on the KY-614 board.

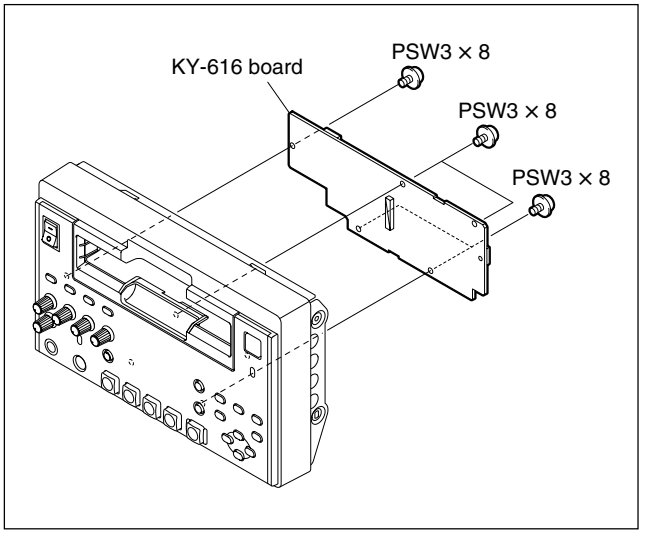


6. Remove the two screws and remove the LCD assembly.
7. Remove the two flexible card wires from the connectors (CN200, CN201) on the KY-614 board.
8. Remove the five VR knobs.
9. Re-attach the parts in reverse order of the disassembling procedure.



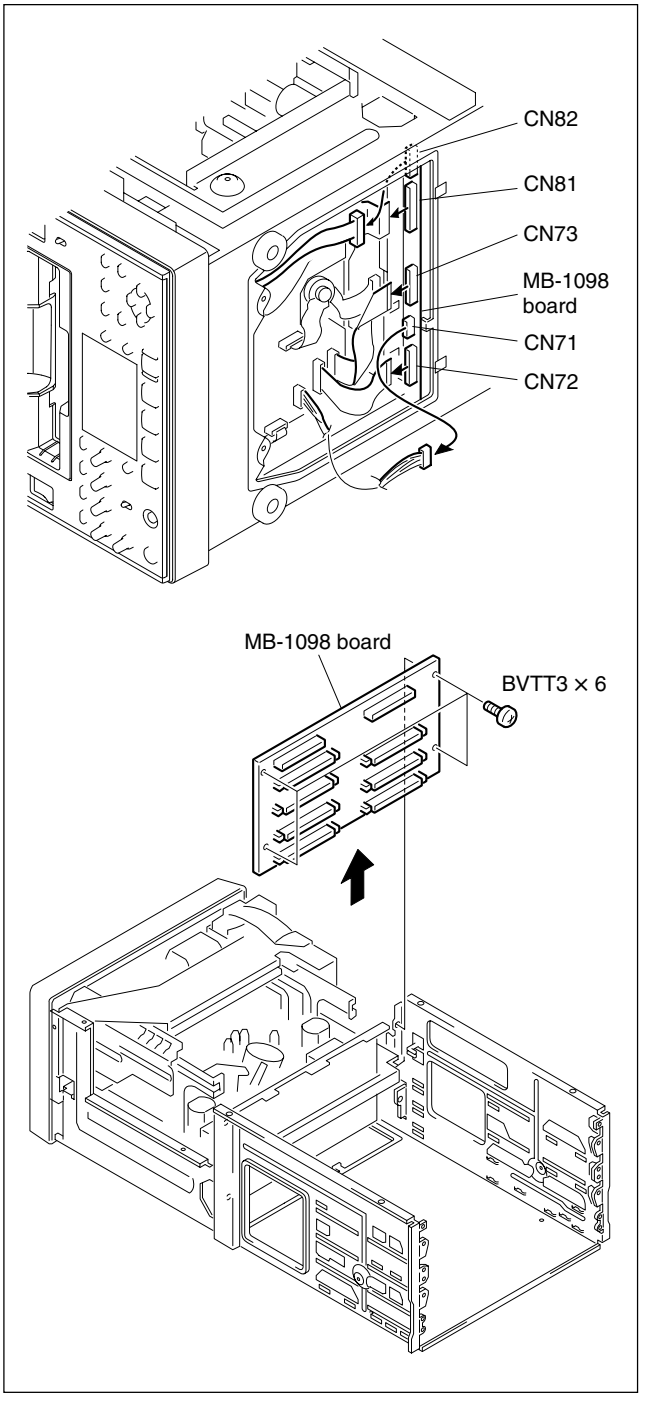
6-26-10. KY-616 Board

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the front panel. (Refer to Section 2-7-2.)
3. Remove the four screws and remove the KY-616 board.
4. Re-attach the parts in reverse order of the disassembling procedure.



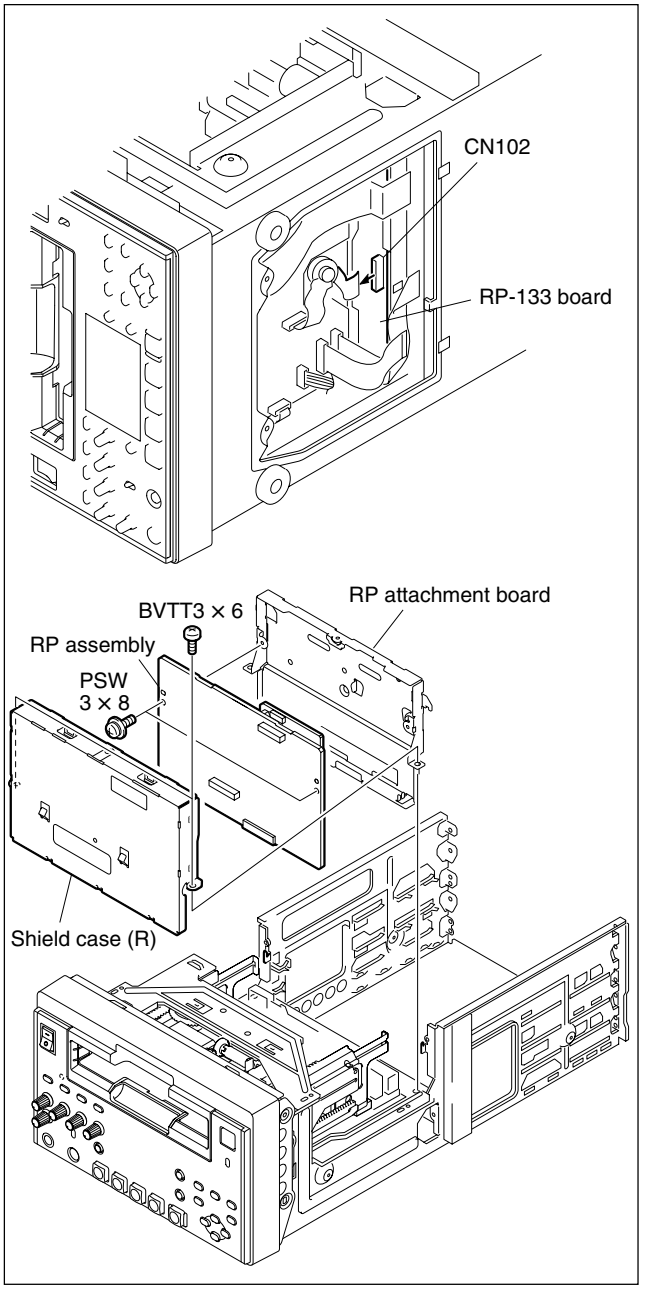
6-26-11. MB-1098 Board

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the bottom panel. (Refer to Section 2-7-2.)
3. Remove the harnesses and the flexible card wires connected to the four connectors (CN71, CN72, CN73, CN81, CN82) on the MB-1098 board.
4. Remove the plug-in boards. (Refer to Section 6-26-1.)
5. Remove the DDE-22 board. (Refer to Section 6-26-4.)
6. Remove the switching regulator. (Refer to Section 6-25.)
7. Remove the four screws and remove the MB-1098 board.
8. Re-attach the parts in reverse order of the disassembling procedure.

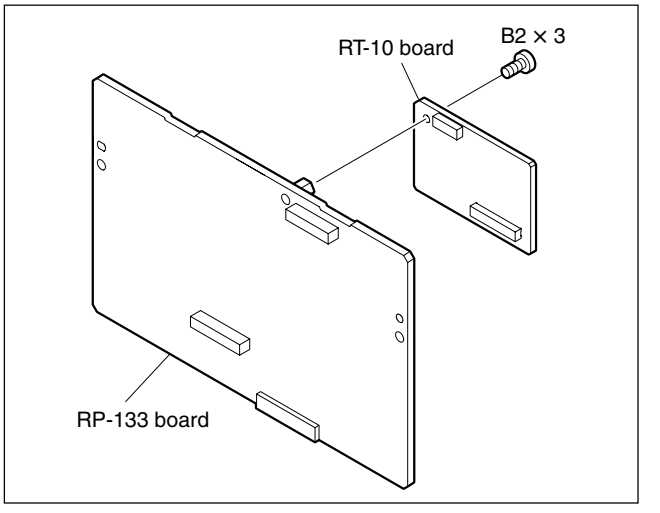


6-26-12. RP-133 Board and RT-10 Board

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the bottom panel. (Refer to Section 2-7-2.)
3. Remove the harnesses and cables from the five connectors on the MB-1098 board. (Refer to Section 6-26-11.)
4. Remove the flexible card wire connected to the connector (CN102) on the RP-133 board.
5. Remove the two screws and remove the shield case (R) and the RP attachment panel.
6. Remove the two screws and remove the RP assembly.

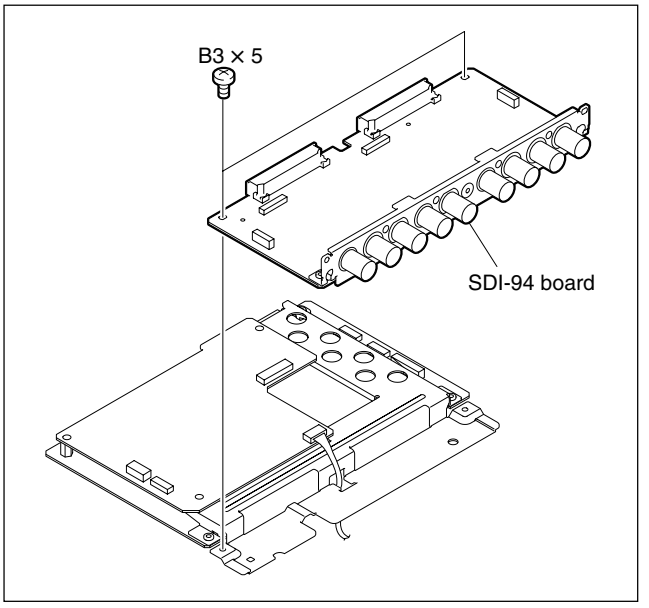


7. Remove the screw and remove the RT-10 board.
8. Re-attach the parts in reverse order of the disassembling procedure.



6-26-13. SDI-94 Board

1. Remove the rear panel. (Refer to Section 2-7-4.)
2. Remove the SDI assembly. (Refer to Section 6-26-1.)
3. Remove the CN-2905 board.
   (Refer to Section 6-26-3.)
4. Remove the two screws and remove the SDI-94 board.
5. Re-attach the parts in reverse order of the disassembling procedure.



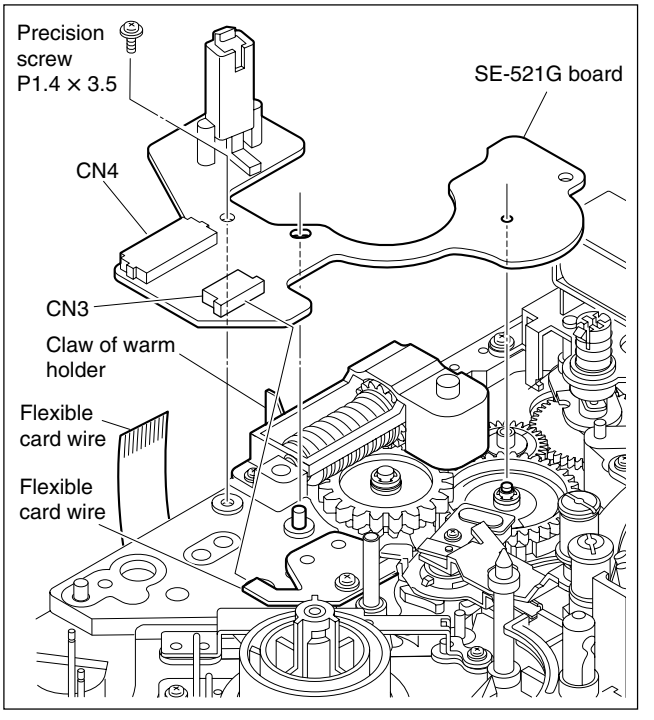
6-26-14. SE-521G Board

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the cassette compartment. (Refer to Section 2-8.)
3. Remove the TG1 arm assembly. (Refer to Section 6-12.)
4. Remove the loading motor assembly.
   (Refer to Section 6-16.)
5. Remove the flexible card wire connected to the connector (CN3) on the SE-521G board.
6. Remove the flexible card wire connected to the connector (CN4) on the SE-521G board.
7. Remove the precision screw and remove the SE-521G board.
8. Insert the hole and long hole on the SE-521G board into the two shafts of the chassis and fix the board with a precision screw.
   Tightening torque : 0.1•Nm {1 kgf•cm}

   Note

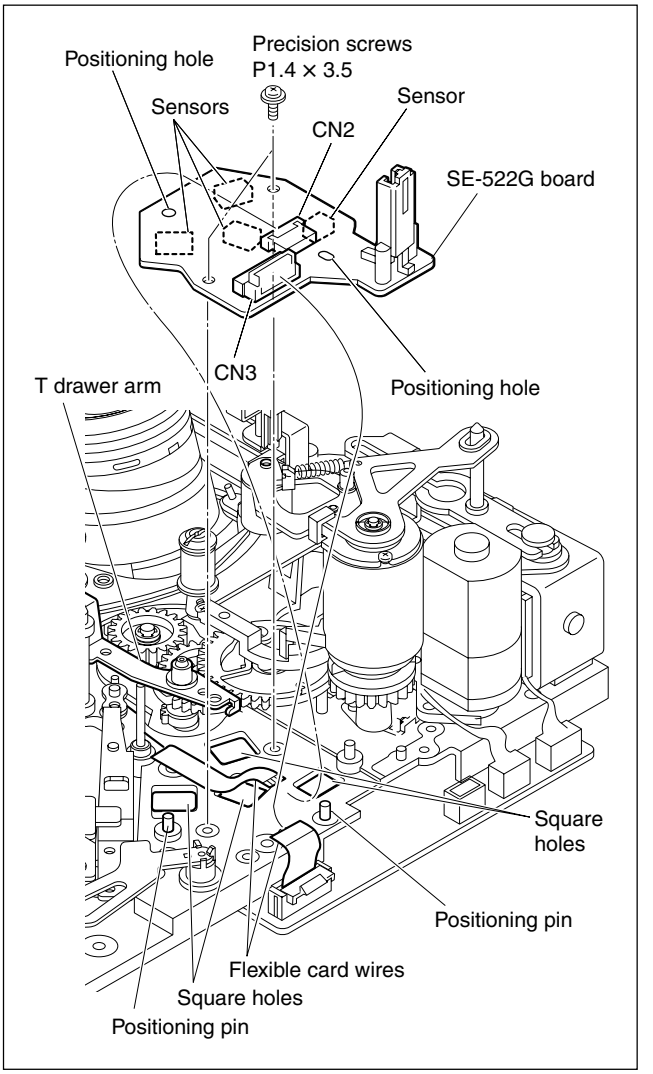
   Do not pinch the tip of the flexible card wire on the S tension regulator assembly in between the SE-521G board and the MD chassis.
   Put the board under the claw of the warm holder.

9. Connect the flexible card wire to the connector (CN4) on the SE-521G board.
10. Connect the flexible card wire on the S tension regulator assembly to the connector (CN3) on the SE-521G board.
11. Attach the loading motor assembly.
    (Refer to Section 6-16.)
12. Attach the TG1 arm assembly. (Refer to Section 6-12.)



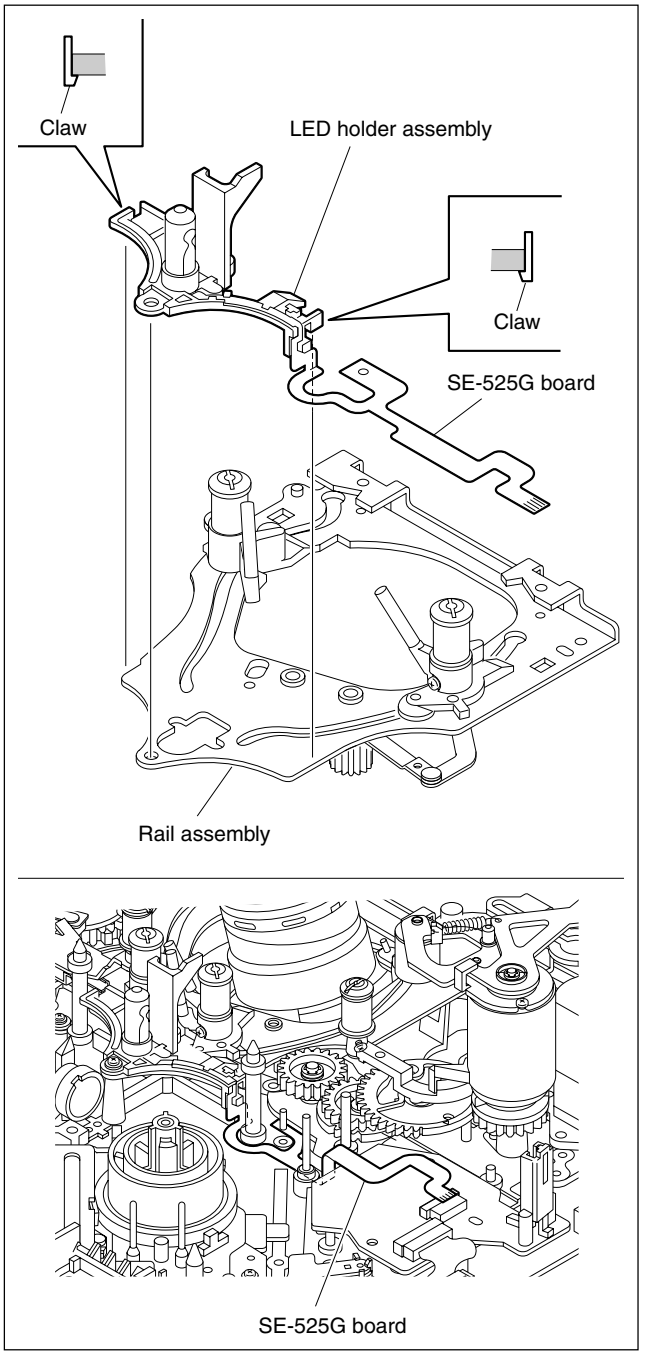
6-26-15. SE-522G Board

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the cassette compartment. (Refer to Section 2-8.)
3. Remove the flexible card wires from the connectors (CN2, CN3) on the SE-522G board.
4. Remove the two precision screws (P1.4 × 3.5) and remove the SE-522G board while avoiding contacting the T drawer arm assembly.
5. Insert the two positioning holes on the SE-522G board into the positioning pins on the MD chassis, and insert the sensors (PH1, PH2, PH3) into the square hole on the MD chassis.
6. Re-attach the parts in reverse order of steps 1 through 5 of the disassembling procedure.
   Tightening torque : 0.1 N•m {1 kgf•cm}



6-26-16. SE-525G Board (LED Holder Assembly)

1. Remove the top panel. (Refer to Section 2-7-1.)
2. Remove the cassette compartment. (Refer to Section 2-8.)
3. Remove the RMP retainer (T1) assembly. (Refer to Section 6-7.)
4. Remove the rail assembly. (Refer to Section 6-14.)
5. Remove the LED holder assembly from the rail assembly.
6. Attach the LED holder assembly to the rail assembly.
7. Re-attach the parts in reverse order of steps 1 through 4 of the disassembling procedure.
   Tightening torque : 0.1 N•m {1 kgf•cm}



Section 7
Tape Path Alignment

Tape path adjustment is very important adjustment to run tape under the optimum conditions for tape.
If this adjustment is not performed correctly, tape may be damaged.
Perform this adjustment with utmost attention.
Perform this adjustment after the cassette compartment assembly is removed from VTR.

7-1. General Information for Tape Path Adjustment

Tools

1. Alignment tape

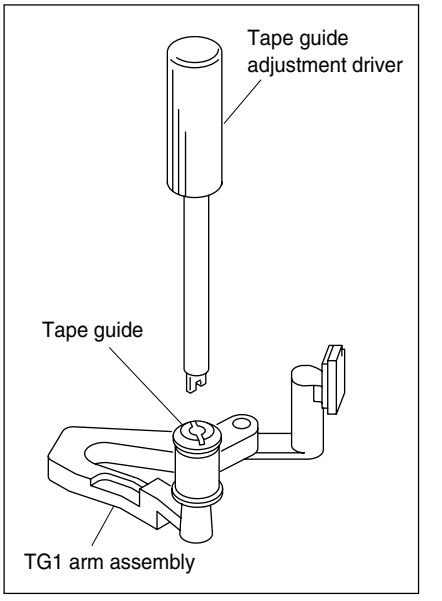
The following alignment tapes are necessary for tape path adjustment.

- XH2-1AST (Standard cassette) : 8-967-999-02
- XH5-1A2 (Mini cassette) : 8-967-999-22 (60i)
- XH5-1AP2 (Mini cassette) : 8-967-999-26 (50i)

2. Tape guide adjustment driver

The following tape guide adjustment driver which is available as the Sony service tool is necessary for height adjustment of tape guide.

- Tape guide adjustment driver : J-6082-362-A



3. Tape path adjustment tool

Use the following tape path adjustment tool to parforme the tape path adjustment.

- Tape path adjustment board, DJ-461 : J-6444-610-B
- Tape path tool connection cable, DJ-472 : J-6444-720-A
- Tape path tool power supply cable, DJ-500 : J-6445-000-A

4. The required tools in addition to the above listed tools.

- DC regulated power supply
- Oscilloscope (Tektronix 2445B or equivalent)
- Small mirror for adjustment : J-6080-029-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- REMOTE CONTROL UNIT (SVRM-100A, DSRM-10 or equivalent)

Preparation of Tape Path Adjustment

1. Cassette compartment assembly

It is not necessary to remove the cassette compartment assembly during tape path adjustment.

2. Cleaning the tape running surface

Clean the tape running surface of tape guides, head drum and video heads using the cleaning cloth moistened with cleaning fluid.

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

3. Information to use the tracking alignment tape (XH2-1AST)

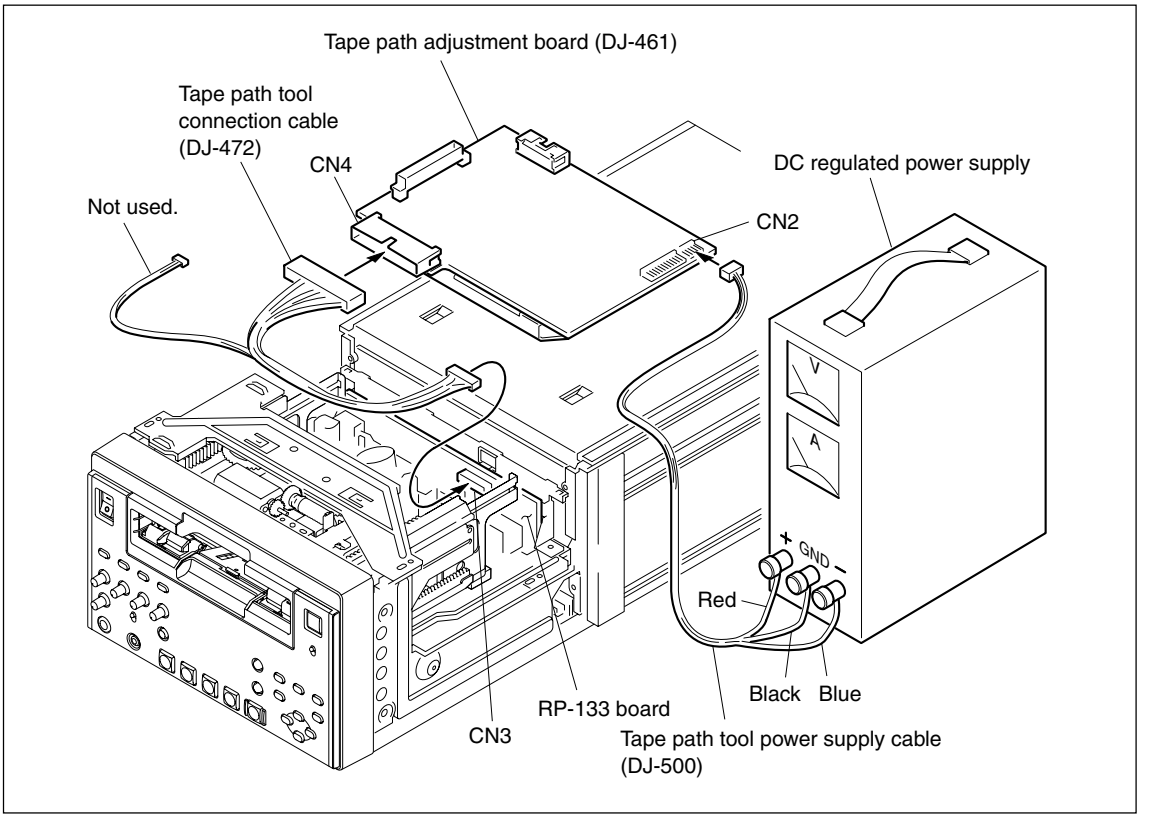
Check the following items before entering the tracking adjustment mode.

- How to enter the maintenance menu, refer to Section 4-2-2.
- How to exit the maintenance menu, refer to Section 4-2-3.

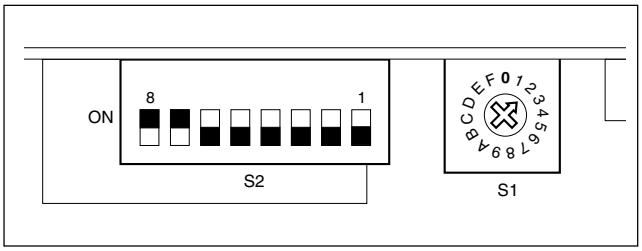
4. Connecting the tape path adjustment tool

To adjust the tape path, use the tape path adjustment board (DJ-461), tape path tool connection cable (DJ-472), tape path tool power supply cable (DJ-500), and DC regulated power supply.

(1) Set the output of the DC regulated power supply to +12 Vdc/−12 Vdc.
(2) Insert the connector of the tape tape path tool connection cable (DJ-472) into the connector (CN4) of the path adjustment board (DJ-461).
(3) Insert another connector of the tape path tool connection cable (DJ-472) into the connector (CN3) on the RP-133 board.
(4) Insert the connector of the tape path tool connection cable (DJ-500) into the connector (CN2) of the tape path adjustment board (DJ-461).
(5) Connect the tape path tool power supply cable (DJ-500) to the DC regulated power supply.



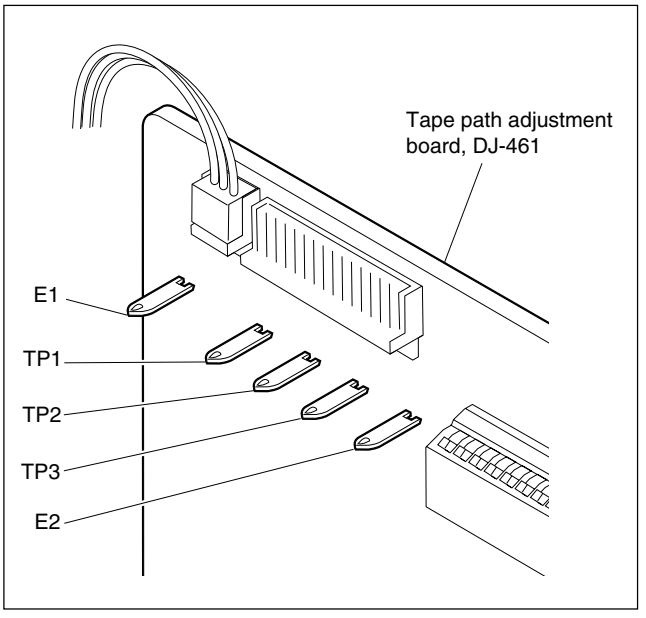
5. Switch setting of the tape path adjustment board (DJ-461)



SW	Bit	Setting	Function
S1	–	2	Select the R/P head.
S2	1	OFF	
	2	OFF	
	3	OFF	
	4	OFF	
	5	OFF	
	6	OFF	
	7	ON	
	8	ON	Activate the switch setting of DJ-461

6. Measuring points/signal for adjustment

Signal name	Board	Measuring point
RF output (signal after envelope detection)	DJ-461	TP2
Switching pulse output	DJ-461	TP3
GND	DJ-461	E1
	DJ-461	E2



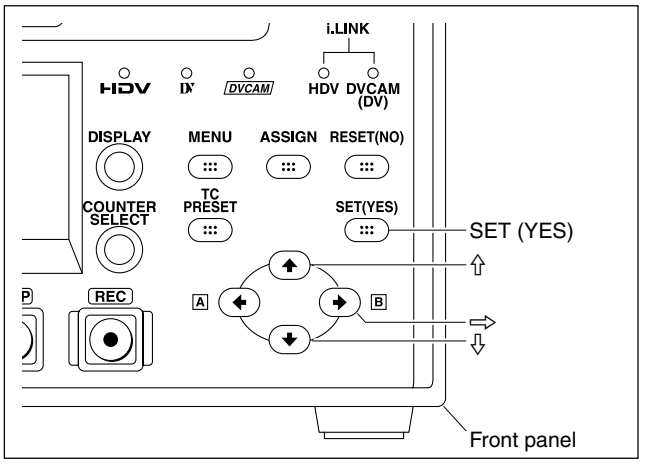
Note

HEAD	S1	SWITCHING
R/P E*1	[2]	H
R/P O	[2]	L

*1 : The head that is used for tape path adjustment when switches S2-7 and S2-8 on the path adjustment board (DJ-461) are ON.

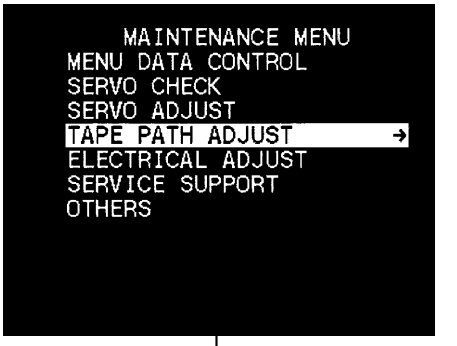
7. Operating procedures of tracking adjustment

Use the keys of ⇧, ⇩, ⇨ and SET (YES) on the front panel to perform the tracking adjustment.

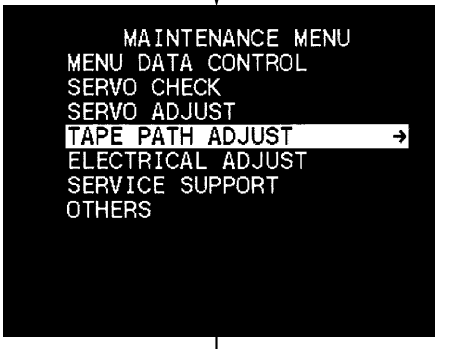


(1) Enter the maintenance menu.

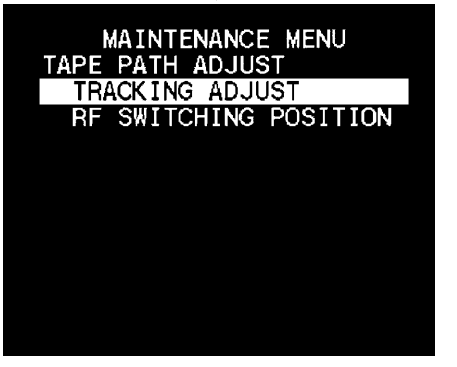
(2) Move the cursor to “TAPE PATH ADJUST” which is displayed with a white background using the ⇧, ⇩ keys.



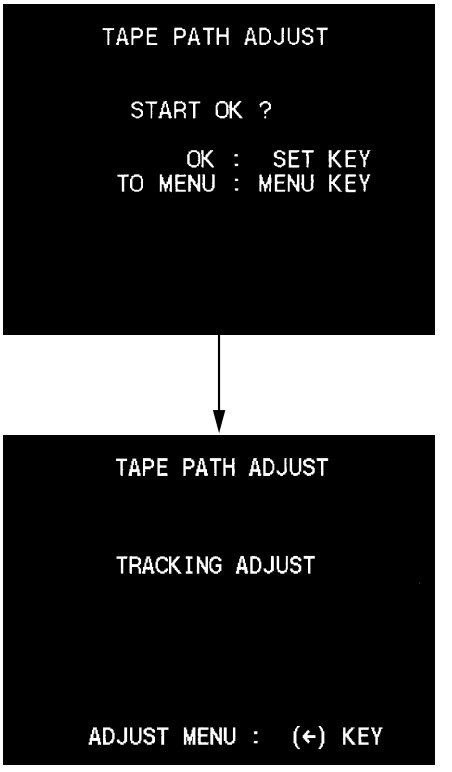
(3) Press the ⇨ key.
This selects “TAPE PATH ADJUST” and menu of the lower level directory appears.



(4) Move the cursor to “TRACKING ADJUST” which is displayed with a white background using the ⇧, ⇩ keys.



(5) Press the ⇨ key to show the “START OK?” display.

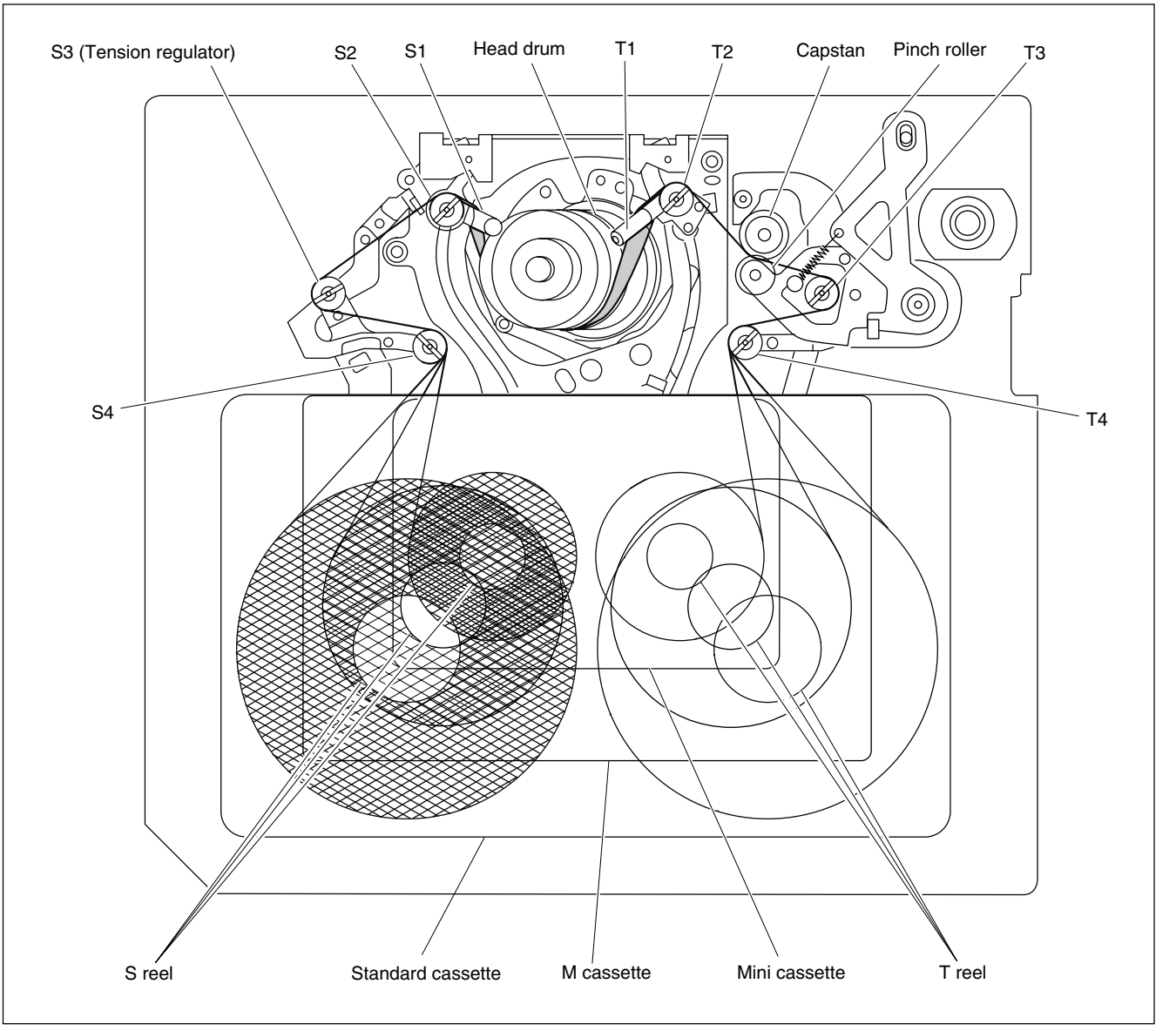


(6) Press the SET (YES) key.
(7) Display the “TRACKING ADJUST” on the screen. The adjustments that are described in sections 7-2, 7-4 to 7-8 are performed under this mode.

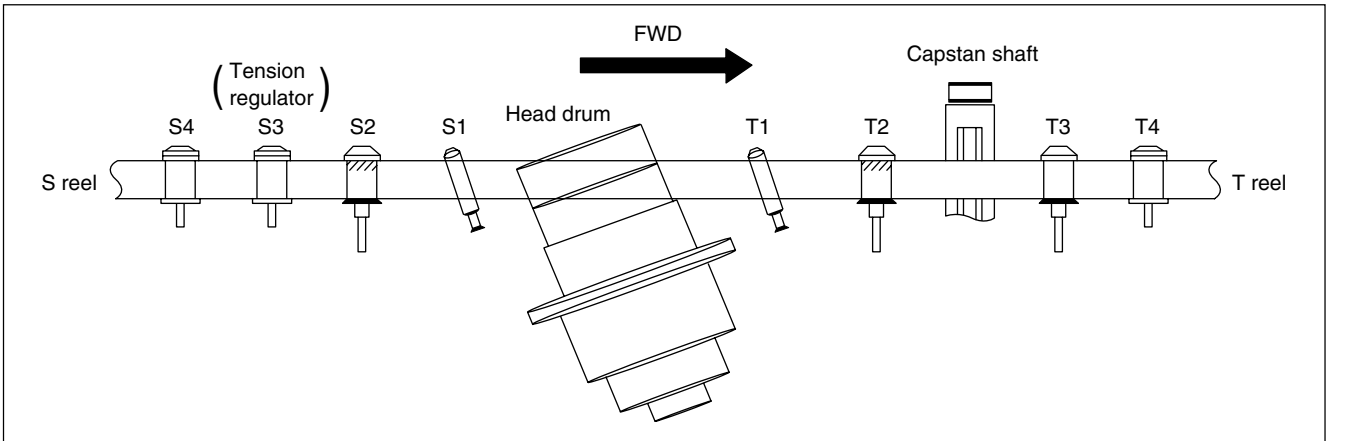
Note

This unit does not have the tracking shift function. Instead of having the tracking shift function, the tracking alignment tape XH2-1AST has already been recorded in the factory so that the servo is locked at 50 % off-track automatically.

8. Tape guide locations



9. Tape running condition



The hatched areas (marked by /////) are contacting with tape or pressing tape.

7-2. Tape Path Adjustment

To perform the tracking adjustment using the alignment tape (XH2-1AST), refer the following items.

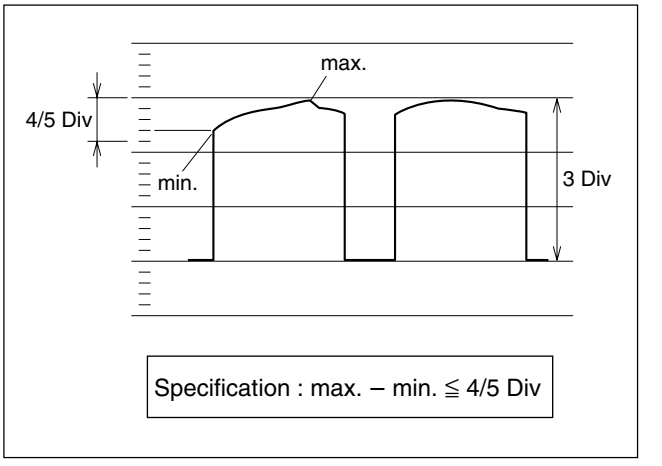
- For the procedure to enter the maintenance menu, refer to Section 4-2-2.
- For the procedure to exit the maintenance menu, refer to Section 4-2-3.
- For the operating procedure of the maintenance menu during the tracking adjustment, refer to Section 7-1.

Tools

- Alignment tape, XH2-1AST : 8-967-999-02
- Tape path adjustment board, DJ-461 : J-6444-610-B
- Tape path tool connection cable, DJ-472 : J-6444-720-A
- Tape path tool power supply cable, DJ-500 : J-6445-000-A
- DC regulated power supply
- Dual trace oscilloscope

Check Procedure

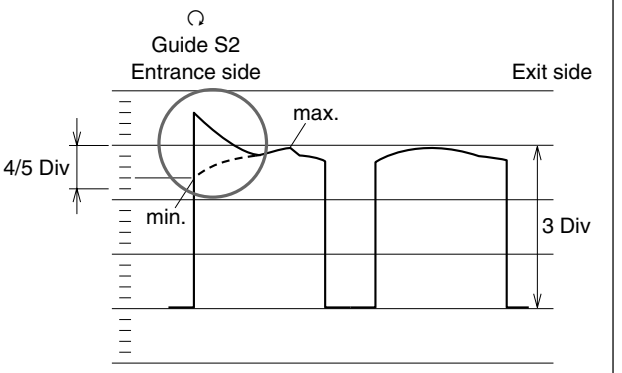
1. Connect the oscilloscope as follows :
   CH-1 : TP2 / DJ-461
   CH-2 : TP3 / DJ-461
   TRIG : CH-2
2. Insert the alignment tape XH2-1AST on the VTR.
3. Put the unit into PLAY mode.
4. Adjust the variable VOLTS/DIV control of the oscilloscope so that the maximum amplitude of the RF waveform becomes the three DIVISIONs on the oscilloscope.



5. Adjust the RF waveform until it satisfies the specification by changing the height of the S2 and T2 guides.
   - When the RF waveform at the entrance side forms the shape of the solid line shown in Fig.1, turn the guide S2 clockwise to obtain the flat waveform.

     Note

     This adjustment must end with the clockwise rotation of the guide S2.



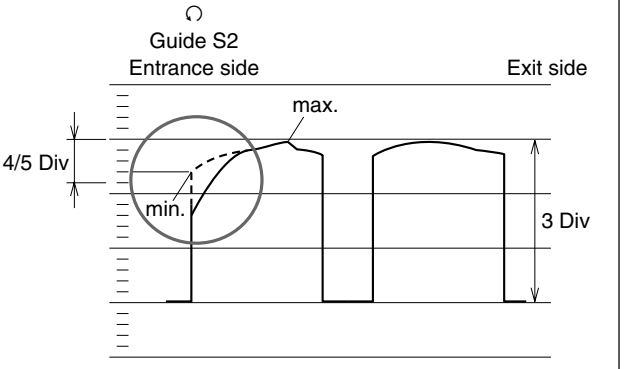
Specification : max. – min. ≦ 4/5 Div

Fig.1

   - When the RF waveform at the entrance side forms the shape of the solid line shown in Fig.2, turn the guide S2 counterclockwise to waveform as shown by the solid line in Fig.1. Then turn the guide S2 clockwise to obtain the desired waveform.

     Note

     This adjustment must end with the clockwise rotation of the guide S2.



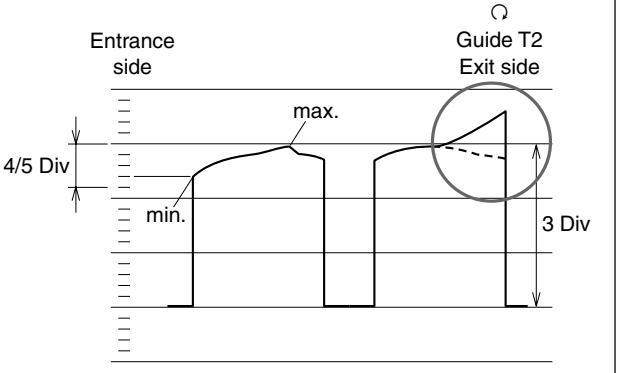
Specification : max. – min. ≦ 4/5 Div

Fig.2

   - When the RF waveform at the exit side forms the shape of the solid line shown in Fig.3, turn the guide T2 clockwise to obtain the flat waveform.

     Note

     This adjustment must end with the clockwise rotation of the guide T2.



Specification : max. – min. ≦ 4/5 Div

Fig.3

- When the RF waveform at the exit side forms the shape of the solid line shown in Fig.4, turn the guide T2 counterclockwise to waveform as shown by the solid line in Fig. 3. Then turn the guide T2 clockwise to obtain the desired waveform.

  Note

  This adjustment must end with the clockwise rotation of the guide T2.

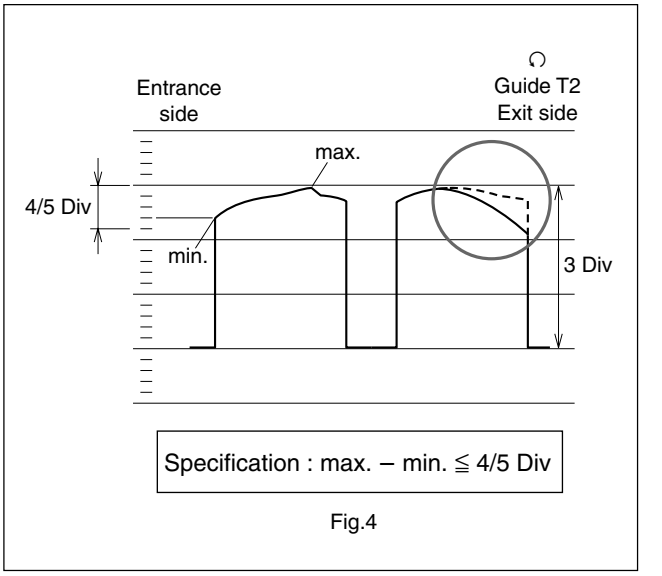
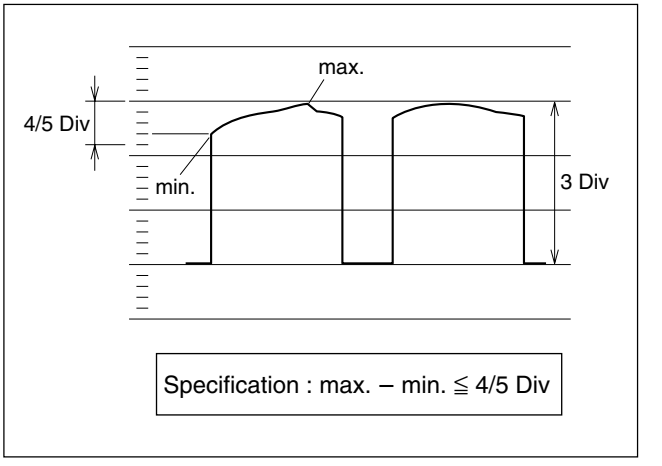


Fig.4

6. Measure the minimum amplitude of the RF waveform, and confirm that the amplitude difference between the maximum and the minimum of the RF waveform satisfies the specification.



7-3. RF Switching Position Adjustment

Be sure to perform the RF switching position adjustment whenever the tape path adjustment (refer to Section 7-2) is performed.
Perform this adjustment in the AUTO mode.

To perform the RF switching position adjustment using the alignment tape (XH5-1A2 for 60i or XH5-1AP2 for 50i), refer the following items.

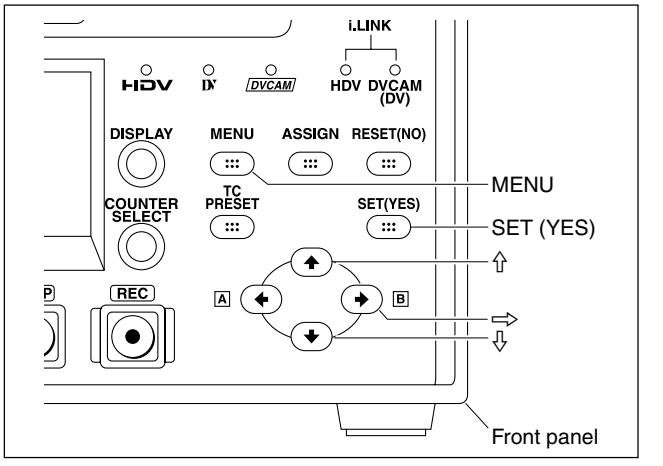
- For the procedure to enter the maintenance menu, refer to Section 4-2-2.
- For the procedure to exit the maintenance menu, refer to Section 4-2-3.

Tools

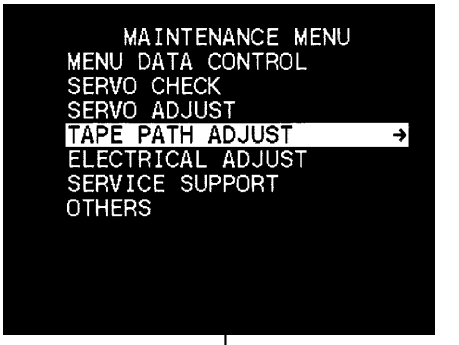
Alignment tape, XH5-1A2 : 8-967-999-22 (for 60i)
XH5-1AP2 : 8-967-999-26 (for 50i)

Adjustment procedure RF switching position adjustment using the [AUTO adjustment]

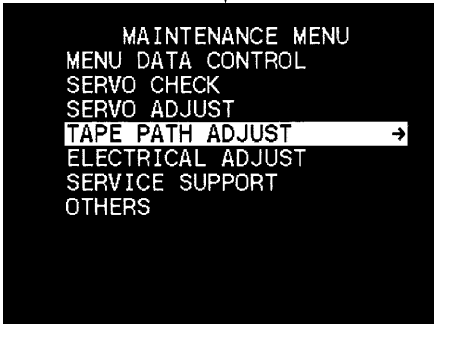
Use the keys of ⇧, ⇩, ⇨, [MENU] and [SET (YES)] on the front panel to perform the tracking adjustment.



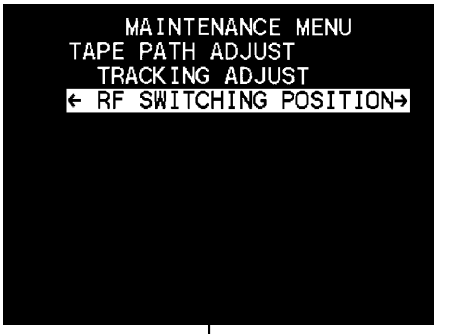
1. Enter the maintenance menu.
2. Move the cursor to “TAPE PATH ADJUST” which is displayed with a white background using the ⇧, ⇩ keys.



3. Press the ⇨ key.
“TAPE PATH ADJUST” is selected and its lower layer submenu appears.



4. Move the cursor to “RF SWITCHING POSITION” which is displayed with a white background using the ⇧, ⇩ keys.



5. Select “START OK?” by pressing the ⇨ key.

①

6. Press the SET (YES) key.

②

7. Playback the alignment tape XH5-1A2 for 60i or XH5-1AP2 for 50i. (display ②)
Then the unit starts the RF switching position automatic adjustment. (display ③)

③

④

8. When the adjustment is completed, the display ⑤ "COMPLETE" appears and alignment tape is automatically ejected.

   Note

   When the "ADJUST INCOMPLETE" appears on the monitor screen, check that the alignment tape which is played back is XH5-1A2 for 60i, or XH5-1AP2 for 50i.

⑤

9. Upon completion of adjustment the alignment tape is ejected automatically.
10. Press the MENU key to return to the maintenance menu.

7-4. Tape Path Adjustment Confirmation

When Section 7-2, “Tape Path Adjustment” is completed, be sure to perform Section 7-3. “RF Switching Position Adjustment”.

To perform tracking adjustment using the alignment tape (XH2-1AST), refer to the following items.

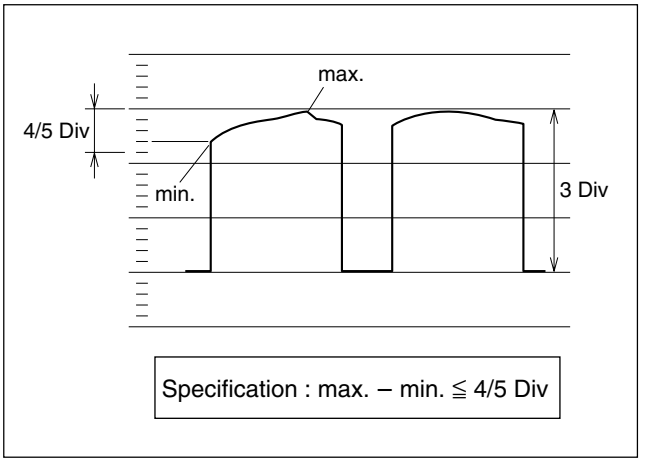
- For the procedure to enter the maintenance menu, refer to Section 4-2-2.
- For the procedure to exit the maintenance menu, refer to Section 4-2-3.
- For the operating procedure of the maintenance menu during the tracking adjustment, refer to Section 7-1.

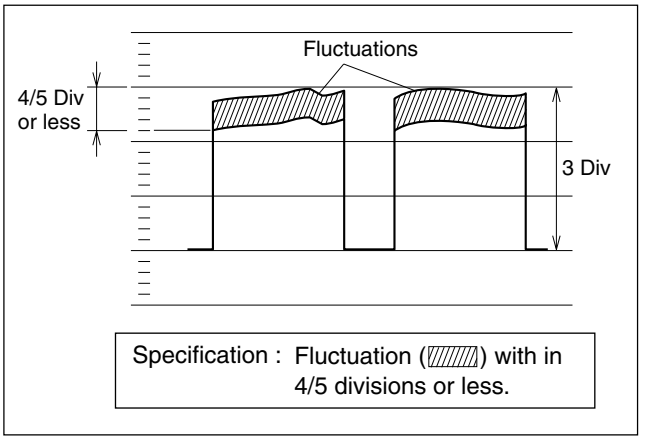
Tools

- Alignment tape, XH2-1AST : 8-967-999-02
- Tape path adjustment board, DJ-461 : J-6444-610-B
- Tape path tool connection cable, DJ-472 : J-6444-720-A
- Tape path tool power supply cable, DJ-500 : J-6445-000-A
- DC regulated power supply
- Dual trace oscilloscope

Check Procedure

1. Connect the oscilloscope as follows :
   CH-1 : TP2/DJ-461
   CH-2 : TP3/DJ-461
   TRIG : CH-2
2. Insert the alignment tape XH2-1AST on the VTR.
3. Put the unit into PLAY mode.
4 Adjust the variable VOLTS/DIV control of the oscilloscope so that the maximum amplitude of the RF waveform becomes the three DIVISIONs on the oscilloscope.
5. Measure the minimum amplitude of the RF waveform, and confirm that the amplitude difference between the maximum and the minimum of the RF waveform satisfies the specification.
6. Confirm that fluctuation of the RF waveform satisfies the specification.





7-5. Search Forward (×5) Waveform Check

Basic Knowledge

To perform tracking adjustment using the alignment tape (XH2-1AST), refer to the following items.

- For the procedure to enter the maintenance menu, refer to Section 4-2-2.
- For the procedure to exit the maintenance menu, refer to Section 4-2-3.
- For the operating procedure of the maintenance menu during the tracking adjustment, refer to Section 7-1.

Tools

- Alignment tape, XH2-1AST : 8-967-999-02
- Tape path adjustment board, DJ-461 : J-6444-610-B
- Tape path tool connection cable, DJ-472 : J-6444-720-A
- Tape path tool power supply cable, DJ-500 : J-6445-000-A
- DC regulated power supply
- Dual trace oscilloscope
- REMOTE CONTROL UNIT

Check Procedure

1. Connect the oscilloscope as follows :
   CH-1 : TP2/DJ-461
   CH-2 : TP3/DJ-461
   TRIG : CH-2
2. Insert the alignment tape XH2-1AST on the VTR.
3. Set the JOG dial on the remote control unit search FORWARD to the × 5 position.
4. Adjust the variable VOLTS/DIV control of the oscilloscope so that the maximum amplitude of the RF waveform becomes the three DIVISIONs on the oscilloscope.
5. Confirm that the RF waveform should be almost the same amplitude with constant intervals as shown in Fig.1.
6. Confirm that the RF waveform raises up within two seconds at the specified amplitude when the mode is changed from search FORWARD (× 5) to PLAY.

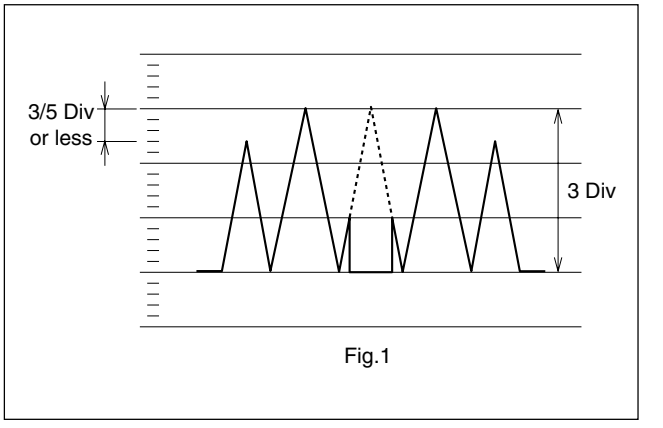
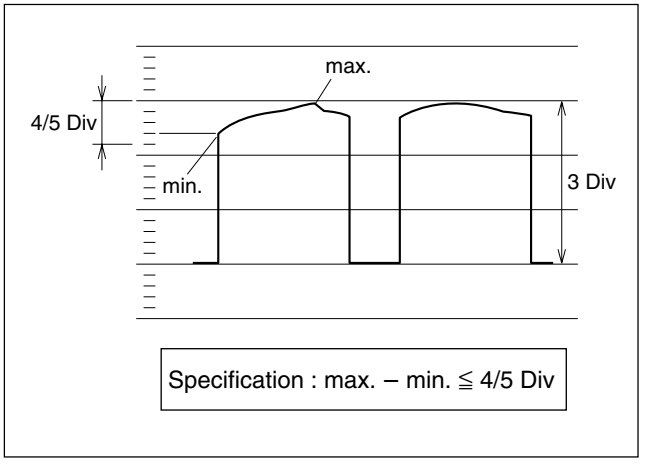


Fig.1



7-6. Search Reverse (×5) Waveform Check

Basic Knowledge

To perform tracking adjustment using the alignment tape (XH2-1AST), refer to the following items.

- For the procedure to enter the maintenance menu, refer to Section 4-2-2.
- For the procedure to exit the maintenance menu, refer to Section 4-2-3.
- For the operating procedure of the maintenance menu during the tracking adjustment, refer to Section 7-1.

Tools

- Alignment tape, XH2-1AST : 8-967-999-02
- Tape path adjustment board, DJ-461 : J-6444-610-B
- Tape path tool connection cable, DJ-472 : J-6444-720-A
- Tape path tool power supply cable, DJ-500 : J-6445-000-A
- DC regulated power supply
- Dual trace oscilloscope
- REMOTE CONTROL UNIT

Check Procedure

1. Connect the oscilloscope as follows :
   CH-1 : TP2/DJ-461
   CH-2 : TP3/DJ-461
   TRIG : CH-2
2. Insert the alignment tape XH2-1AST on the VTR.
3. Set the JOG dial on the remote control unit search REVERSE to the × 5 position.
4. Adjust the variable VOLTS/DIV control of the oscilloscope so that the maximum amplitude of the RF waveform becomes the three DIVISIONs on the oscilloscope.
5. Confirm that the RF waveform should be almost the same amplitude with constant intervals as shown in Fig.1.
6. Confirm that the RF waveform raises up within two seconds at the specified amplitude when the mode is changed from search REVERSE (× 5) to PLAY.

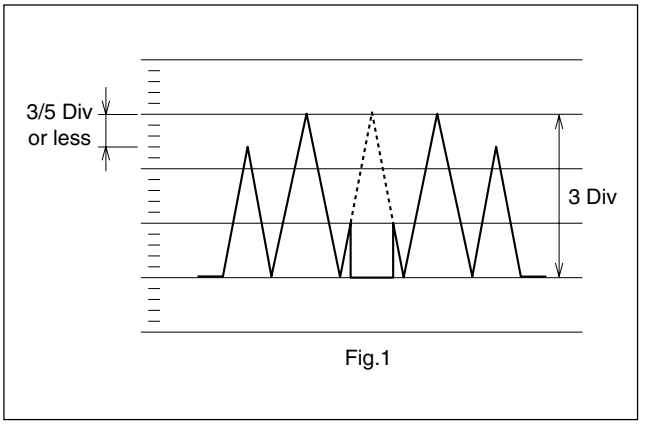
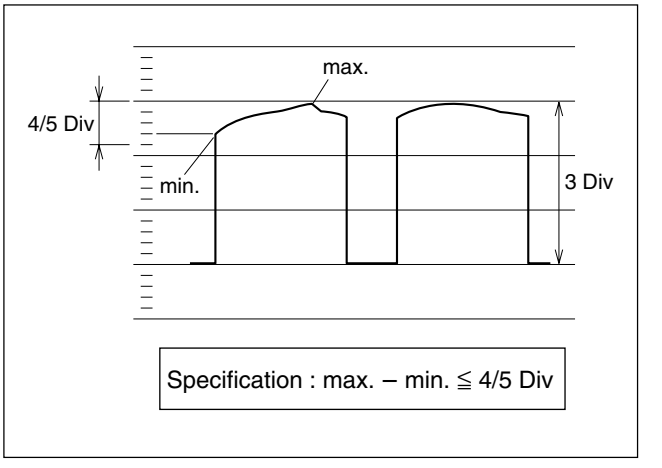


Fig.1



7-7. RF Waveform Raiseup Check

To perform tracking adjustment using the alignment tape (XH2-1AST), refer to the following items.

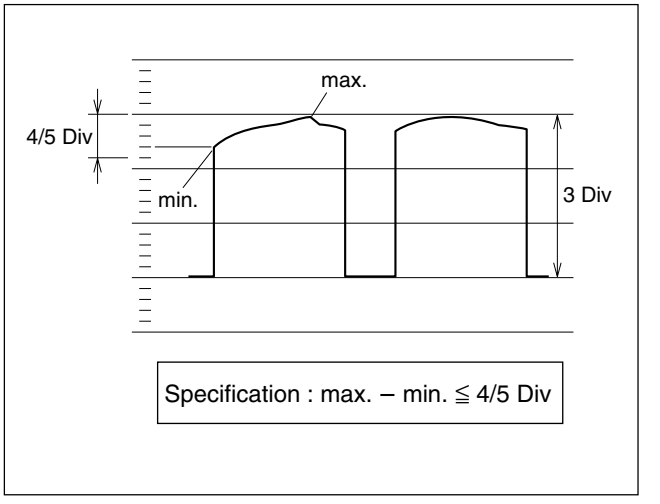
- For the procedure to enter the maintenance menu, refer to Section 4-2-2.
- For the procedure to exit the maintenance menu, refer to Section 4-2-3.
- For the operating procedure of the maintenance menu during the tracking adjustment, refer to Section 7-1.

Tools

- Alignment tape, XH2-1AST : 8-967-999-02
- Tape path adjustment board, DJ-461 : J-6444-610-B
- Tape path tool connection cable, DJ-472 : J-6444-720-A
- Tape path tool power supply cable, DJ-500 : J-6445-000-A
- DC regulated power supply
- Dual trace oscilloscope

Check Procedure

1. Connect the oscilloscope as follows :
   CH-1 : TP2 / DJ-461
   CH-2 : TP3 / DJ-461
   TRIG : CH-2
2. Insert the alignment tape XH2-1AST on the VTR.
3. Confirm that the RF waveform raises up within two seconds at the specified amplitude when the mode is changed from EJECT → PLAY → EJECT → PLAY repeatedly.
4. Confirm that the RF waveform raises up within two seconds at the specified amplitude when the mode is changed from FF → PLAY and from REW → PLAY.



7-8. Tape Curl Check at Tape Guide

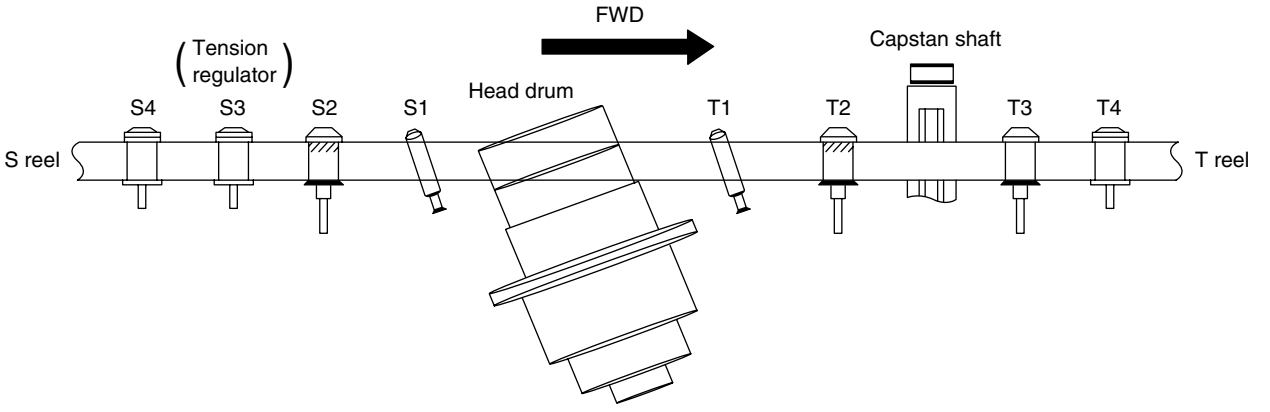
Tools

- Alignment tape, XH2-1AST : 8-967-999-02
- Dental mirror : J-6080-029-A

Check Procedure

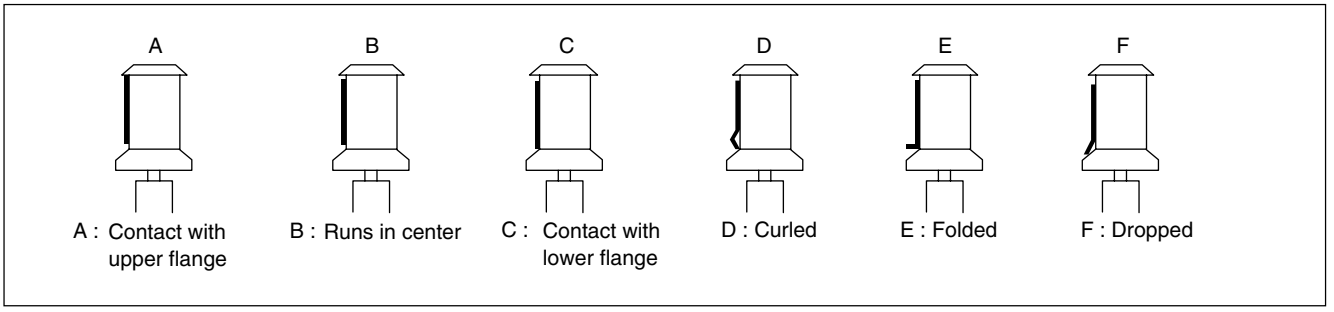
Confirm that tape runs at each tape guide as specified by the following figure when the unit put into the modes of PLAY, FF and REW respectively.

Tape running condition



The hatched areas (marked by /////) are contacting with tape or pressing tape.

	Tape running condition					
Tape guide	A (Contact with upper flange)	B (Runs in the center)	C (Contact with lower flange)	D (Curled)	E (Folded)	F (Dropped)
S4	○	○	○	×	×	×
S3	○	○	○	×	×	×
S2	○	×	×	×	×	×
T2	○	×	×	×	×	×
T3	○	○	○	×	×	×
T4	○	○	○	×	×	×



Section 8
Electrical Alignment

8-1. Electrical Alignment Overview

8-1-1. Precautions

- Some items in this section require to perform adjustment in both the 59.94 Hz mode and the 50 Hz mode. Switch the mode and adjust as directed.
- Be sure to adjust each block in order unless any instructions are provided.
- Do not contact with adjusting part when other than required.
- For details on the maintenance mode, refer to Section 4.
- Before beginning adjustment, it is recommended to make a copy of setup conditions. If customer conditions are noted, the settings can be returned easily to its customer condition after finishing adjustment.
  - Setting of switches on front panel.
  - Setup menu (Refer to Section 4-3-1.)

8-1-2. Outline of Electrical Alignment

In Section 8 explains the all electrical adjustment to each block.

Block	Reference	Contents	Object of adjustment
Audio	Section 8-2	Audio output level adjustment, Audio EE level adjustment	AVP-7, DDE-22
Video	Section 8-3	Internal clock frequency adjustment, Video signal output level adjustment Video signal REC level adjustment	AVP-7, DDE-22
SDI	Section 8-4	SDI free-running adjustment	SDI-94
LCD	Section 8-5	LCD adjustment	KY-614, KY-616

8-1-3. Equipment and Fixture

Equipment and Fixture	Model name	Remark
Oscilloscope	Tektronix TDS460A or equivalents	
Video signal generator	Tektronix TSG-130A or equivalents	For 59.94 Hz mode
	Tektronix TSG-131A or equivalents	For 50 Hz mode
Waveform monitor	Tektronix 1750A or equivalents	
Audio level meter	Agilent technologies HP3400A or equivalents	
Frequency counter	Advantest TR5821 or equivalents	
Extension board	DJ-516	

8-2. Audio Adjustment

8-2-1. Audio Output Level Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the AVP-7 board. (Refer to Section 2-15.) • SETUP MENU MENU GRADE: ENHANCED ↓ REF LEVEL: –20dB OUTPUT LEVEL: +4dB INT AUDIO SG: 1 kHz SINE CASSETTE OUT: EE • Cassette tape: EJECT • Front panel VIDEO INPUT SELECT: SG AUDIO INPUT SELECT: SG VARIABLE: PRESET	AUDIO OUT 1/3 (600 Ω loaded) AUDIO OUT 2/4 (600 Ω loaded) Spec. : +4.0 ±0.1 dBm	CH1: ⊘RV301/AVP-7 (B-4) CH2: ⊘RV302/AVP-7 (A-4)

8-2-2. Audio EE Level Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the DDE-22 board. (Refer to Section 2-15.) • SETUP MENU MENU GRADE: ENHANCED ↓ REF LEVEL: –20dB OUTPUT LEVEL: +4dB INT AUDIO SG: 1 kHz SINE CASSETTE OUT: EE • Cassette tape: EJECT • Front panel VIDEO INPUT SELECT: SG AUDIO INPUT SELECT: ANALOG VARIABLE: PRESET • Rear panel AUDIO INPUT 1/3: 1 kHz, +4 dBu AUDIO INPUT 2/4: 1 kHz, +4 dBu	AUDIO OUT 1/3 (600 Ω loaded) AUDIO OUT 2/4 (600 Ω loaded) Spec. : +4.0 ±0.3 dBm	CH1: ⊘RV500/DDE-22 (D-7) CH2: ⊘RV501/DDE-22 (D-7)

8-3. Video Adjustment

8-3-1. Preparation in the 59.94 Hz Mode

1. Setting the Switches and SETUP MENU

This setting should be fixed in position unless otherwise specified.

Remote control switch

LOCAL/9PIN/i.LINK: LOCAL

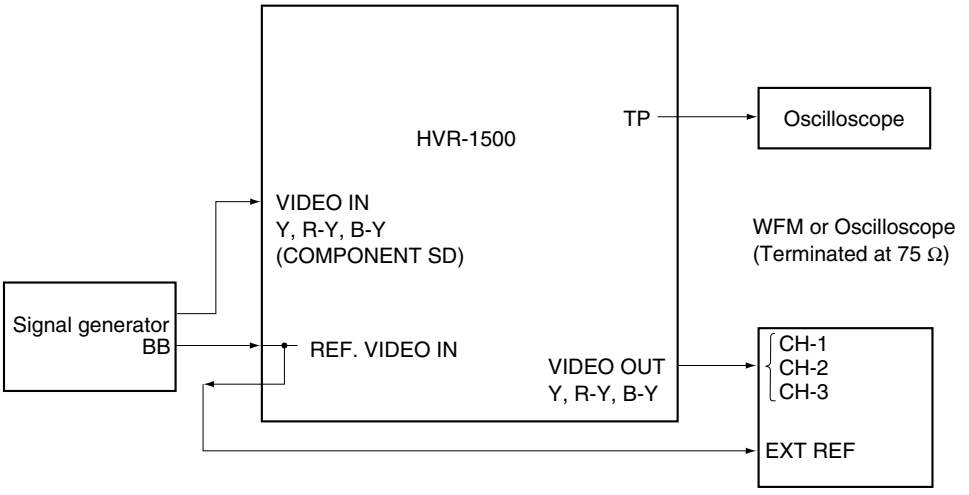
SETUP MENU

CHRA.DISPLAY: ON
SETUP REMOVE: OFF
SETUP ADD: OFF
SYSTEM SEL: 59.94i (UC)

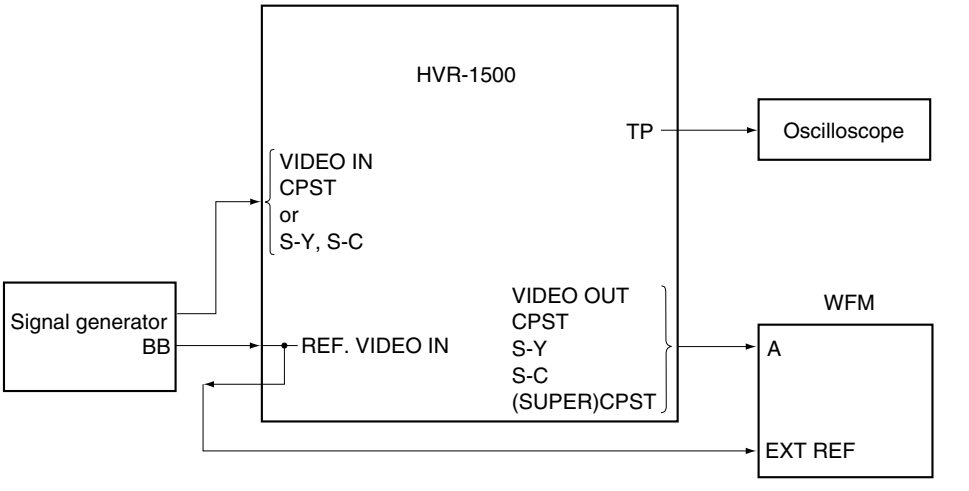
2. Connection

Connect some equipment as following unless otherwise specified.

(Connection 1)

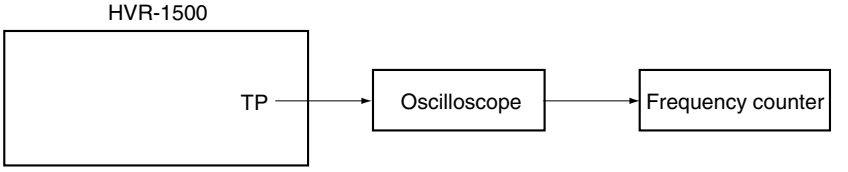


(Connection 2)



8-3-2. HCK Frequency Adjustment

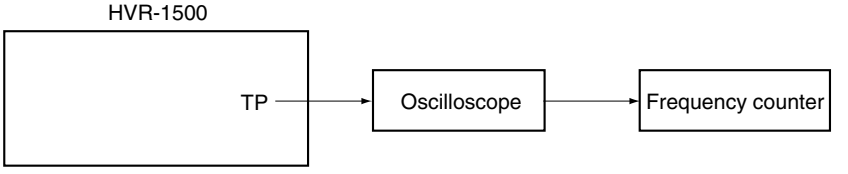
(Connection)



Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the AVP-7 board. (Refer to Section 2-15.) • STOP mode • Front panel VIDEO INPUT SELECT: COMPOSITE • Rear panel REF. VIDEO IN: No signal VIDEO IN: No signal	P151/AVP-7 (A-8) Spec. : f = 27,000,000 ±10 Hz	• MENTENANCE MENU (Refer to Section 4-2-2.) ELECTRICAL ADJUST ↓ AVP BOARD ADJ ↓ CLK 27MHz INT ADJ

8-3-3. HD HCK Frequency Adjustment

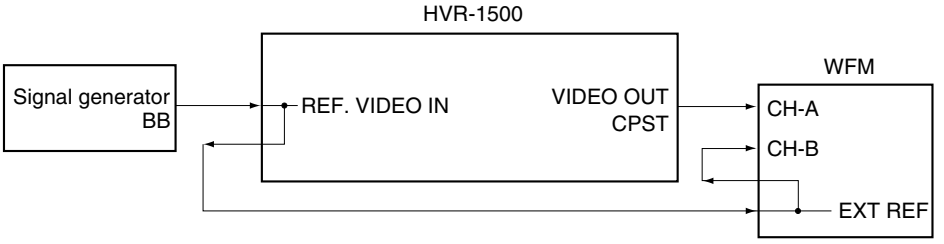
(Connection)

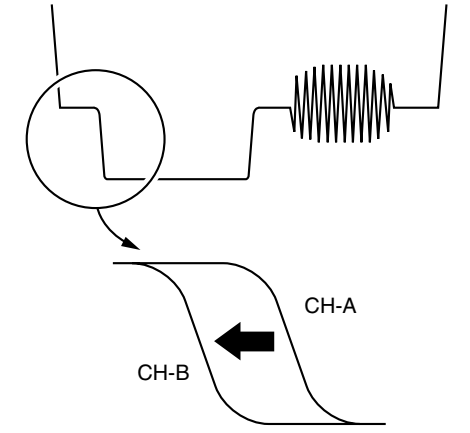


Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the AVP-7 board. (Refer to Section 2-15.) • STOP mode • Front panel VIDEO INPUT SELECT: COMPOSITE • Rear panel REF. VIDEO IN: No signal VIDEO IN: No signal	TP151/AVP-7 (A-8) 59.94 Hz mode Spec. : f = 37,087,912 ±10 Hz 50 Hz mode Spec. : f = 37,125,000 ±10 Hz	• MENTENANCE MENU (Refer to Section 4-2-2.) ELECTRICAL ADJUST ↓ AVP BOARD ADJ ↓ CLK 74/2MHz INT ADJ

8-3-4. SYNC Phase Adjustment

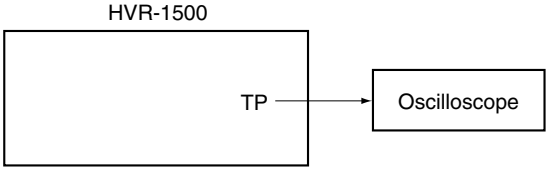
(Connection)

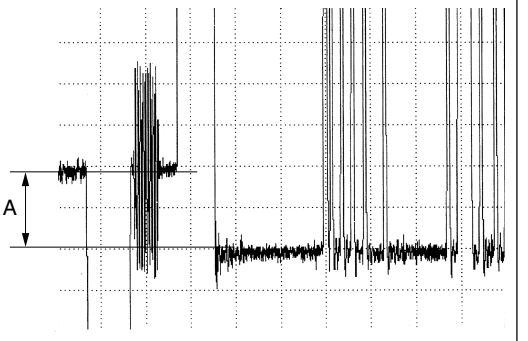


Conditions for adjustment	Measurement point, Specification	Adjustment
• STOP mode • Front panel VIDEO INPUT SELECT: SG • Rear panel REF. VIDEO IN: Black Burst VIDEO IN: No signal	VIDEO OUT CPST  Spec. : SYNC (last transition) of CH-A and CH-B is matched.	• MENTENANCE MENU (Refer to Section 4-2-2.) ELECTRICAL ADJUST ↓ AVP BOARD ADJ ↓ SYNC PHASE ADJ

8-3-5. CHARACTER DC Adjustment

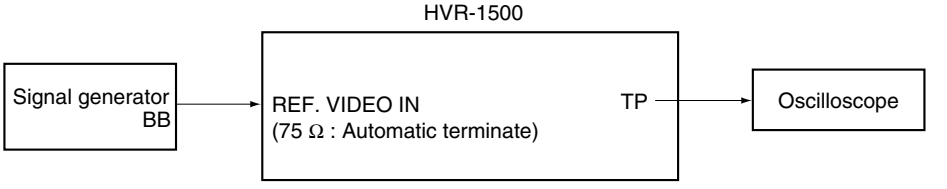
(Connection)

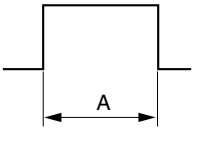


Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the AVP-7 board. (Refer to Section 2-15.) • STOP mode • Front panel VIDEO INPUT SELECT: SG • Rear panel REF. VIDEO IN: No signal VIDEO IN: No signal	TP151/AVP-7 (A-8)  Spec. : Difference A between the blanking level and the black level of the video signal is minimized.	• MENTENANCE MENU (Refer to Section 4-2-2.) ELECTRICAL ADJUST ↓ AVP BOARD ADJ ↓ CHARACTER DC ADJ

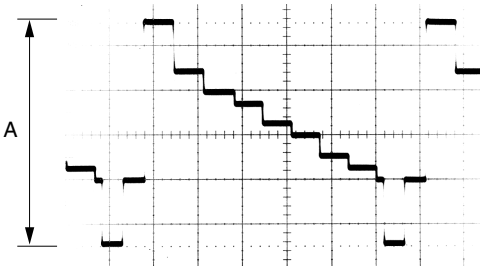
8-3-6. CF DET CENTER Adjustment

(Connection)

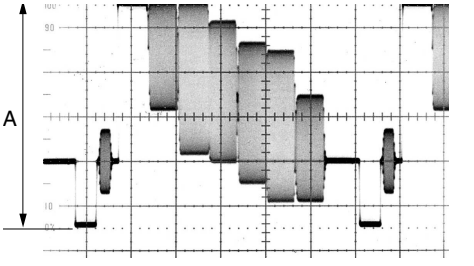


Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the AVP-7 board. (Refer to Section 2-15.) • STOP mode • Front panel VIDEO INPUT SELECT: SG • Rear panel REF. VIDEO IN: Black Burst VIDEO IN: No signal	TP151/AVP-7 (A-8) Leftmost of pulse shape  59.94 Hz mode Spec. : A = 70 ±5 ns 50 Hz mode Spec. : A = 56 ±5 ns	• MENTENANCE MENU (Refer to Section 4-2-2.) ELECTRICAL ADJUST ↓ AVP BOARD ADJ ↓ CF DET CENTERING

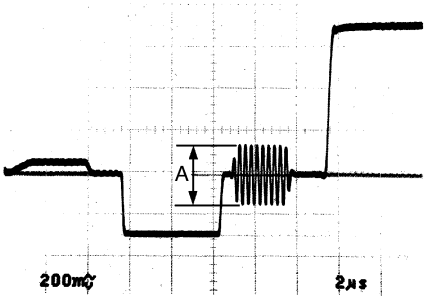
8-3-7. S VIDEO Y Level Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the AVP-7 board. (Refer to Section 2-15.) • SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPOSITE&S-VIDEO • EE mode • Front panel VIDEO INPUT SELECT: SG Connection 2	VIDEO OUT S-Y WFM or Oscilloscope  Spec. : A = 1000 ±10 mV p-p	⊘RV801/AVP-7 (E-3)

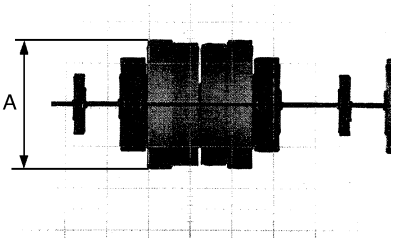
8-3-8. COMPOSITE Video Level Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the AVP-7 board. (Refer to Section 2-15.) • SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPOSITE&S-VIDEO • EE mode • Front panel VIDEO INPUT SELECT: SG Connection 2	VIDEO OUT CPST WFM or Oscilloscope  Spec. : A = 1000 ±10 mV p-p (140.0 ±1.5 IRE)	⊘RV806/AVP-7 (E-2)

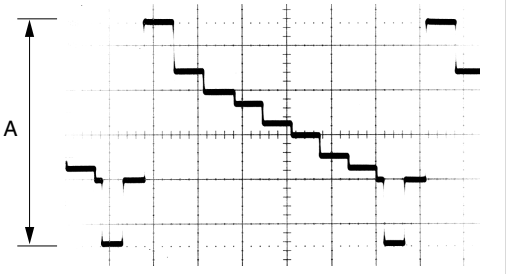
8-3-9. COMPOSITE Burst Level Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the AVP-7 board. (Refer to Section 2-15.) • SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPOSITE&S-VIDEO • EE mode • Front panel VIDEO INPUT SELECT: SG Connection 2	VIDEO OUT CPST WFM or Oscilloscope  Spec. : A = 285.7 ±3.0 mV p-p (40.0 ±0.5 IRE)	⊘RV804/AVP-7 (F-2)

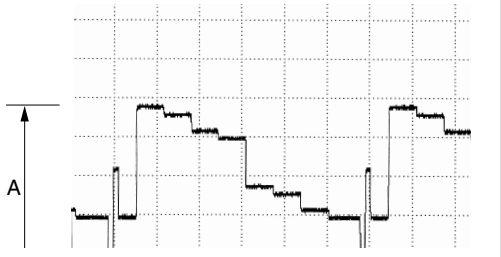
8-3-10. S VIDEO Chroma Level Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the AVP-7 board. (Refer to Section 2-15.) • SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPOSITE&S-VIDEO • EE mode • Front panel VIDEO INPUT SELECT: SG Connection 2	VIDEO OUT S-C WFM or Oscilloscope  Spec. : A = 677.5 ±0.7 mV p-p (87.7 ±1.0 IRE)	⊘RV805/AVP-7 (E-2)

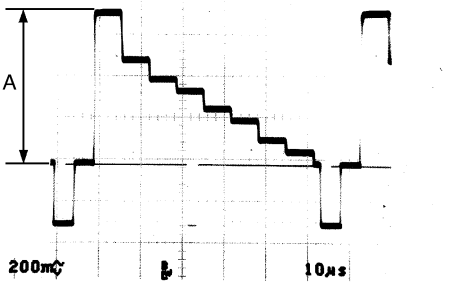
8-3-11. COMPONENT SD Y Level Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the AVP-7 board. (Refer to Section 2-15.) • SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPONENT (SD) • EE mode • Front panel VIDEO INPUT SELECT: SG Connection 1	VIDEO OUT Y  Spec. : A = 1000 ±10 mV p-p (140.0 ±1.5 IRE)	⊘RV802/AVP-7 (F-3)

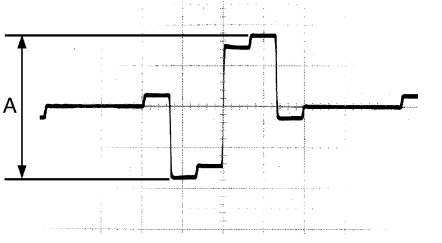
8-3-12. COMPONENT HD Y Level Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the AVP-7 board. (Refer to Section 2-15.) • SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPONENT (HD) • EE mode • Front panel VIDEO INPUT SELECT: SG Connection 1	VIDEO OUT Y  Spec. : A = 1000 ±10 mV p-p	⊘RV807/AVP-7 (E-3)

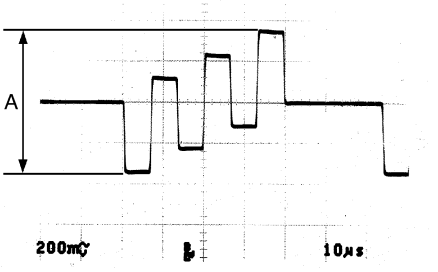
8-3-13. COMPONENT Y REC Level Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the DDE-22 board. (Refer to Section 2-15.) • SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPONENT (SD) • EE mode • Rear panel VIDEO IN: 75% color-bar Connection 1	VIDEO OUT Y WFM or Oscilloscope  Spec. : A = 0.714 ±0.007 V (100 ±1 IRE)	⊘RV102/DDE-22 (E-2)

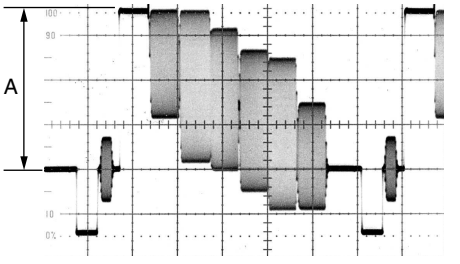
8-3-14. COMPONENT R-Y REC Level Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the DDE-22 board. (Refer to Section 2-15.) • SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPONENT (SD) • EE mode • Rear panel VIDEO IN: 75% color-bar Connection 1	VIDEO OUT R-Y WFM or Oscilloscope  Spec. : A = 0.700 ±0.007 V (98 ±1 IRE)	⊘RV103/DDE-22 (E-2)

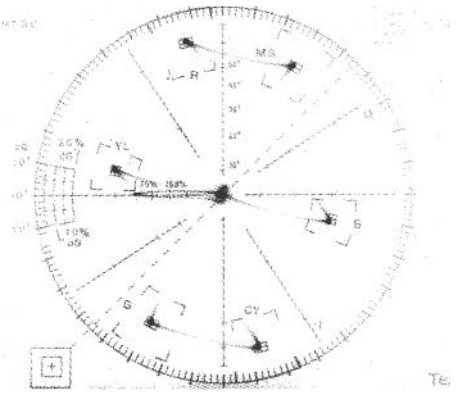
8-3-15. COMPONENT B-Y REC Level Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the DDE-22 board. (Refer to Section 2-15.) • SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPONENT (SD) • EE mode • Rear panel VIDEO IN: 75% color-bar Connection 1	VIDEO OUT B-Y WFM or Oscilloscope  Spec. : A = 0.700 ±0.007 V (98 ±1 IRE)	⊘RV104/DDE-22 (E-1)

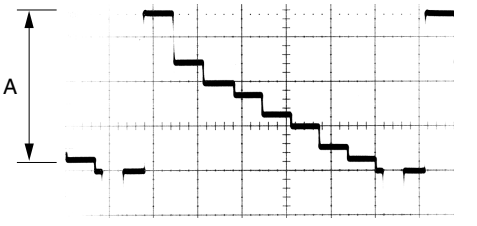
8-3-16. COMPOSITE Y REC Level Check

Conditions for Check	Measurement point, Specification
• SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPOSITE&S-VIDEO • EE mode • Front panel VIDEO INPUT SELECT: COMPOSITE • Rear panel VIDEO IN: 75% color-bar Connection 2	VIDEO OUT CPST WFM or Oscilloscope  Spec. : A = 0.714 ±0.007 V (100 ±1 IRE)

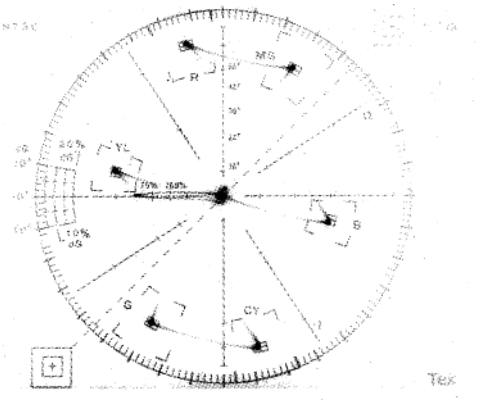
8-3-17. COMPOSITE Chroma REC Level Check

Conditions for Check	Measurement point, Specification
• SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPOSITE&S-VIDEO • EE mode • Front panel VIDEO INPUT SELECT: COMPOSITE • Rear panel VIDEO IN: 75% color-bar Connection 2	VIDEO OUT CPST (A) Burst (B) Chroma Vector  Spec. : (A) Set the dot of the burst in the right position on the scale. (B) All dots should be inside the "⊞" mark on the vector.

8-3-18. S VIDEO Y REC Level Check

Conditions for Check	Measurement point, Specification
• SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPOSITE&S-VIDEO • EE mode • Front panel VIDEO INPUT SELECT: S VIDEO • Rear panel VIDEO IN: 75% color-bar Connection 2	VIDEO OUT S-Y WFM or Oscilloscope  Spec. : A = 0.714 ±0.007 V (100 ±1 IRE)

8-3-19. S VIDEO Chroma REC Level Check

Conditions for Check	Measurement point, Specification	Adjustment
• Extension of the DDE-22 board. (Refer to Section 2-15.) • SETUP MENU MENU GRADE: ENHANCED ↓ VIDEO OUTPUT: COMPOSITE&S-VIDEO • EE mode • Front panel VIDEO INPUT SELECT: S VIDEO • Rear panel VIDEO IN: 75% color-bar Connection 2	VIDEO OUT S-C (A) Burst (B) Chroma Vector  Spec. : (A) Set the dot of the burst in the right position on the scale. (B) All dots should be inside the "⊞" mark on the vector. If the signal does not satisfy the specifications, adjust RV101/DDE-22 (A-2).	⊘PHASE control/Vector ⊘RV101/DDE-22 (G-2)

8-3-20. Adjustment in the 50 Hz Mode

Note

Be sure to perform the adjustments in the 50 Hz mode after completing the adjustment in the 59.94 Hz mode.

1. Setting the Switches and SETUP MENU

This setting should be fixed in position unless otherwise specified.

SETUP MENU

SYSTEM SEL: 50i (PAL)

2. Connection

The signal generator is switched to TSG-131A (for PAL).

3. Adjustment in the 50 Hz Mode

Perform the adjustments as follows.

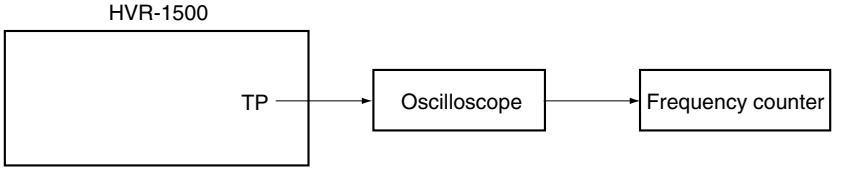
- HD HCK frequency adjustment (Refer to Section 8-3-3.)
- SYNC phase adjustment (Refer to Section 8-3-4.)
- CHARACTER DC adjustment (Refer to Section 8-3-5.)
- CF DET CENTER adjustment (Refer to Section 8-3-6.)

4. Setting the Switches and SETUP MENU

The setting is returned to the customer setting.

8-4. SDI Free-running Adjustment

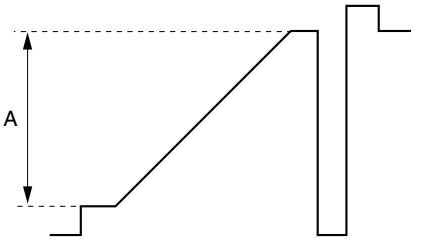
(Connection)



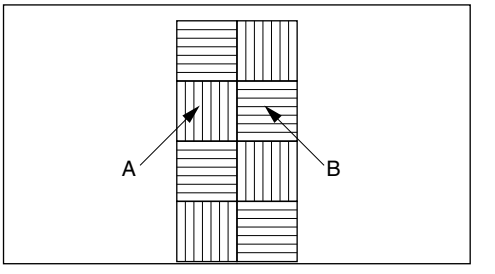
Conditions for adjustment	Measurement point, Specification	Adjustment
Step 1 • Extension of the SDI-94 board. (Refer to Section 2-15.) • EE mode • Connect jumper wire between TP101/ SDI-94 (E-2) and E101/SDI-94 (E-1). • After adjustment, remove jumper wire.	TP102/SDI-94 (E-2) Spec. : f = 27.0 ±0.1 MHz	⊘RV101/SDI-94 (E-1)
Step 2 • Extension of the SDI-94 board. (Refer to Section 2-15.) • EE mode • Connect jumper wire between TP202/ SDI-94 (D-2) and E101/SDI-94 (E-1). • After adjustment, remove jumper wire.	TP201/SDI-94 (D-1) Spec. : f = 27.0 ±0.1 MHz	⊘RV201/SDI-94 (D-2)

8-5. LCD Adjustment

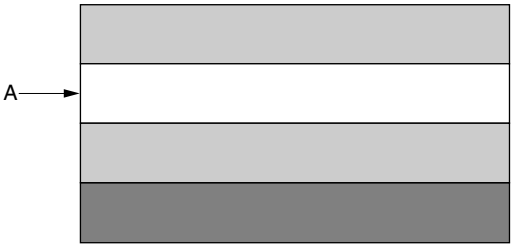
8-5-1. Contrast Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the KY board. (Refer to Section 2-15.)	TP-204/KY-614 (C-2) VG Oscilloscope  Spec. : A = 1.90 ±0.05 V dc	• MENTENANCE MENU (Refer to Section 4-2-2.) ELECTRICAL ADJUST ↓ LCD ADJ ↓ CONTRAST ADJ

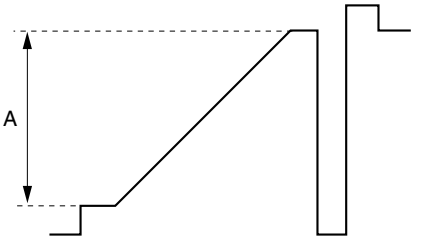
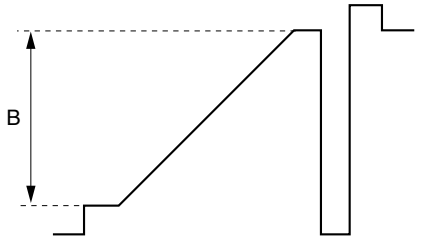
8-5-2. V-COM Adjustment

Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the KY board. (Refer to Section 2-15.)	LCD  Spec. : The difference of the image quality of A and B must be few.	• MENTENANCE MENU (Refer to Section 4-2-2.) ELECTRICAL ADJUST ↓ LCD ADJ ↓ V-COM ADJ

8-5-3. Sample Hold Timing Adjustment

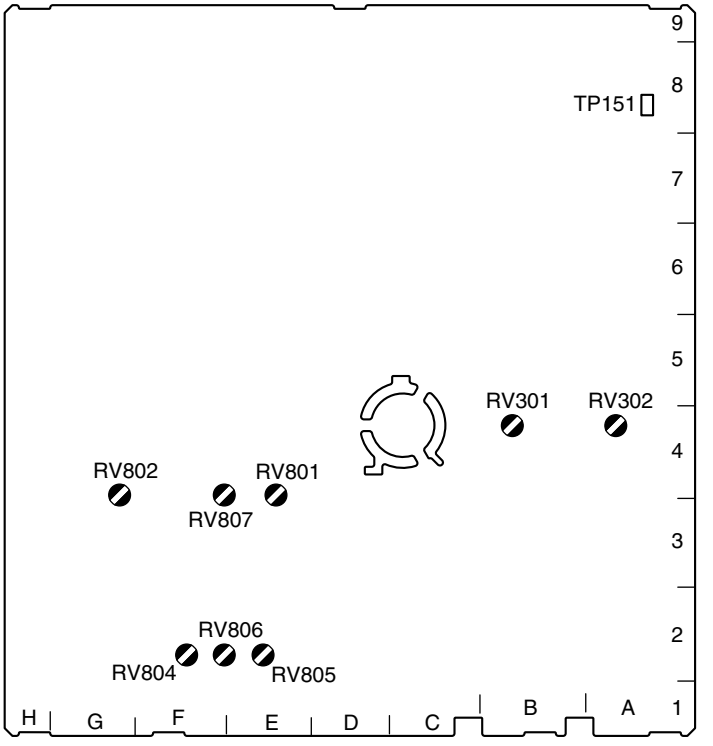
Conditions for adjustment	Measurement point, Specification	Adjustment
• Extension of the KY board. (Refer to Section 2-15.)	LCD is lightened most. After adjustment, press the ⇨ key. LCD  Spec. : The line of A is lightened most. If the signal does not satisfy the specifications, perform the V-COM adjustment. (Refer to Section 8-5-2.)	• MENTENANCE MENU (Refer to Section 4-2-2.) ELECTRICAL ADJUST ↓ LCD ADJ ↓ SMPL HOLD PHASE ADJ

8-5-4. White Balance Adjustment

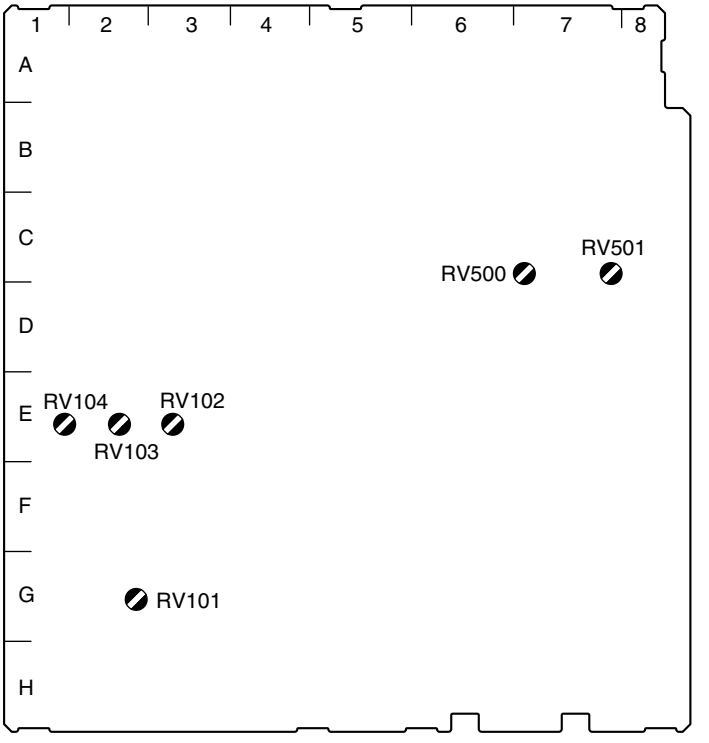
Conditions for adjustment	Measurement point, Specification	Adjustment
Step 1 • Extension of the KY board. (Refer to Section 2-15.)	TP-205/KY-614 (C-2) VR Oscilloscope  Spec. : A = 1.90 ±0.05 V dc After adjustment, press the ⇨ key and switch the VB. TP-206/KY-614 (C-2) VB Oscilloscope  Spec. : B = 1.90 ±0.05 V dc	• MENTENANCE MENU (Refer to Section 4-2-2.) ELECTRICAL ADJUST ↓ LCD ADJ ↓ WHITE BAL COARSE ADJ
Step 2 • Extension of the KY board. (Refer to Section 2-15.)	Press ⇦, ⇨ keys, check the gap of the white balance of LCD. When the gap is caused, the white balance is adjusted by watching.	• MENTENANCE MENU (Refer to Section 4-2-2.) ELECTRICAL ADJUST ↓ LCD ADJ ↓ WHITE BAL FINE ADJ

8-6. Adjustment Related Parts Layout Diagram

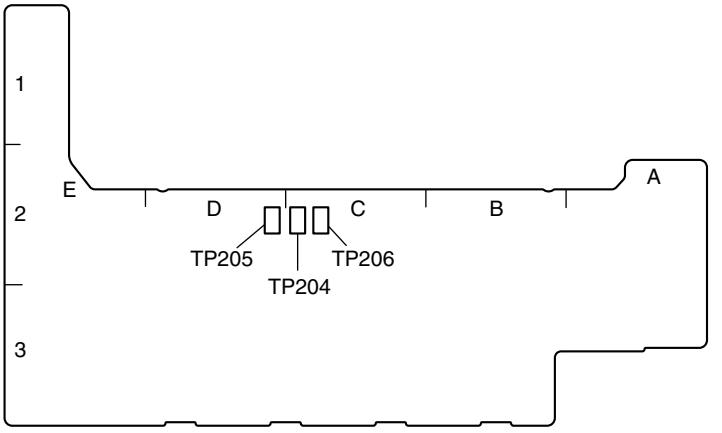
AVP-7 board (A side)



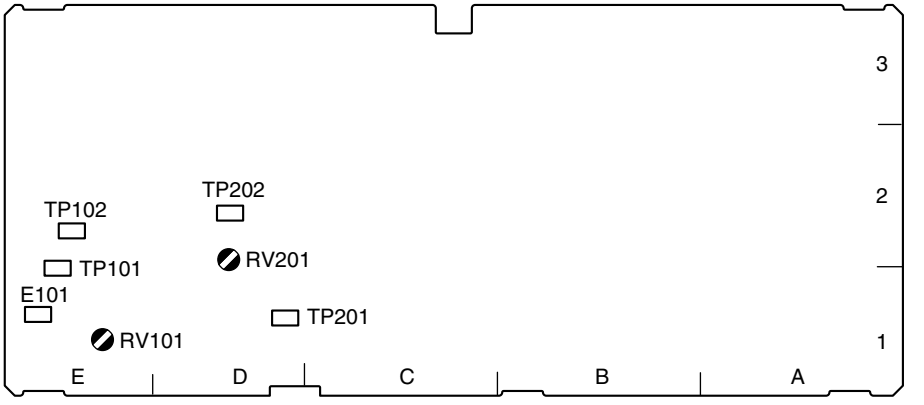
DDE-22 board (A side)



KY-614 board (B side)



SDI-94 board (A side)



SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

Check the metal trim, “metallized” knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA. Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers’ instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The “limit” indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

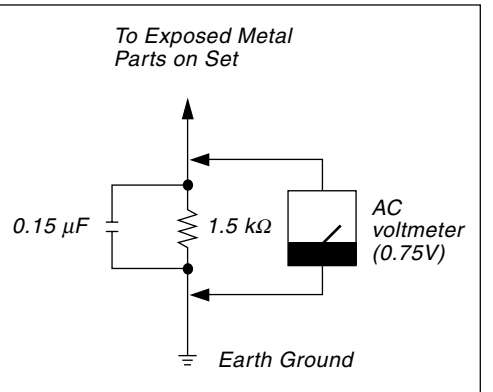


Fig A. Using an AC voltmeter to check AC leakage.

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